Mariners Weather Log

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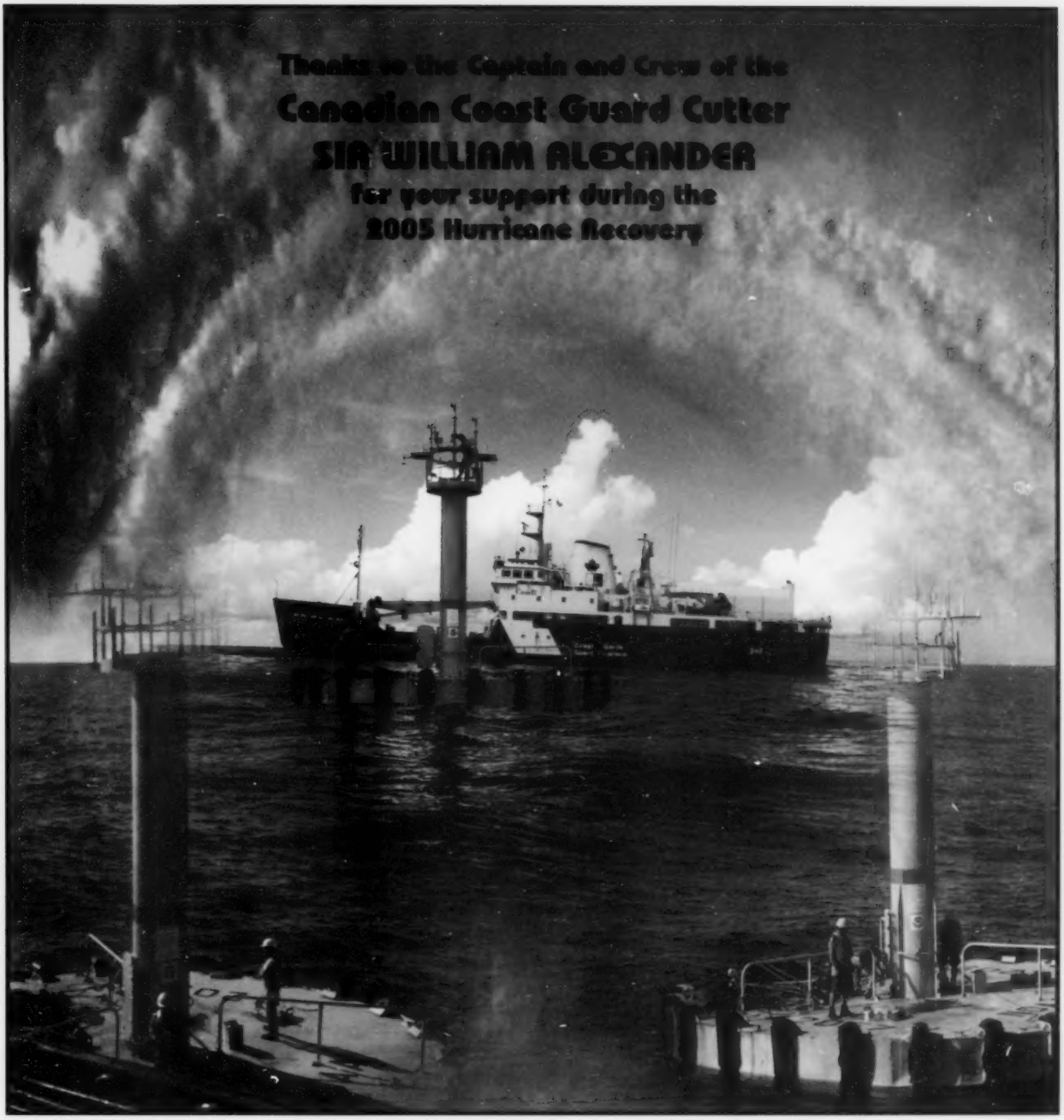

See article page 20: Canadian Beacon—Operation Unison

Mariners Weather Log

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Welcome to another offering of the Mariners Weather Log (MWL). I hope that y'all have faired well during these winter months and for my Austral friends down under (it is our turn for the warm weather…). Springtime is fast approaching and cleanup continues here in South Mississippi. Just when you think you are finally making headway, new and exciting issues appear. I almost had my yard back to normal, if I can ever say that again, and then the county shows up to clear the big tree debris away. Those dozers and bucket trucks sure do quick work on the fallen behemoth trunks and stumps, but now my yard looks like the marines called in an air strike and used bunker busters just for fun… Well, if I ever decide to dig a root cellar or a new well, I have a great start. Maybe I can say these are Mississippi caves and start a tourist trap for the folks traveling to and from New Orleans, hmmm.

Ok, enough idle bantering. I am proud to be the first to tell you about this latest issue of the MWL. Have you ever wondered why the wind speeds from ships and the nearby weather buoys seem contradictory at times? Just read Dave Gilhousen's article on page 4 to understand why. Mr. Frits Koek, the Voluntary Observing Ship Program lead for the Netherlands Weather Service has submitted an interesting article on how he helped with the Whitbread Round the World yachting race by understanding the weather patterns. Skip Gilham has yet again honored us with a historical article about the ship E.M. FORD. We also have two; count them two articles for the "From the Desk of a PMO" section that discusses New Orleans and Miami and the hurricanes from the PMO perspective. There is also a great story that the USCG shared with us on the outstanding support from our Canadian neighbors helping after the hurricanes. A special notice for all reporting ships using AMVER/SEAS. Effective 01 May 2006, the original 3110 transmission address that was setup within your GMDSS will be terminated. Please refer to the guidelines that were in the April 2005 issue and now reprinted in this issue on page 11 to ensure your system is set up to the new transmission address.

I really appreciate all y'all for supporting the Mariners Weather Log and the Voluntary Observing Ship program. I hope that you enjoy reading this issue as much as we have enjoyed preparing it. I also want to re-iterate the joy that the Gulf Coast has received due to all the kind thoughts, prayers, compassion, and assistance given to us all.

Thanks Once Again - Luke ⚓

Some Important Web Page Addresses

NOAA	http://www.noaa.gov
National Weather Service	http://www.weather.gov
National Data Buoy Center	http://www.ndbc.noaa.gov
AMVER Program	http://www.amver.com
VOS Program	http://www.vos.noaa.gov
SEAS Program	http://seas.amverseas.noaa.gov/seas/seasmain.html
Mariners Weather Log	http://www.vos.noaa.gov/mwl.shtml
Marine Dissemination	http://www.nws.noaa.gov/om/marine/home.htm
U.S. Coast Guard Navigation Center	http://www.navcen.uscg.gov/marcomms/

See these Web pages for further links.

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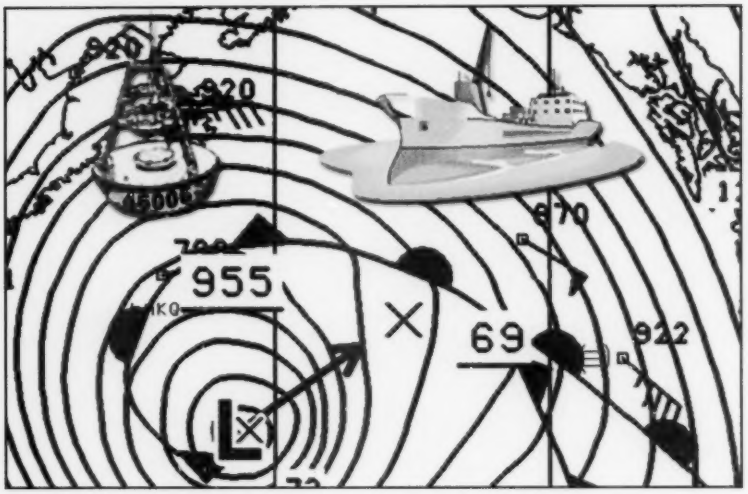
A Complete Explanation of Why Moored Buoy Winds are Less Than Ship Winds

David B. Gilhousen, National Data Buoy Center



Have you ever looked at a weather map and seen a ship reporting a much higher wind speed than a nearby buoy? For example, the ship could have reported 45 kts while the buoy reports 32 kts. Mariners and forecasters have attributed the lower buoy speeds to one or more of these arguments:

- The much lower anemometer heights are on the buoy since the speed increases with height,
- Buoy motion and wave sheltering,
- Longer buoy averaging periods, or,
- Degraded sensors or "buggy" computer software on the unattended buoy.

In addition, many believe that ship anemometers, where they exist, are probably sheltered themselves, and the true, ambient wind speeds are probably higher. If this were the case, it would make the buoy bias more profound.

This article will examine each of these arguments and discover that the truth is not as simple as these blanket statements. Indeed, no one has a complete explanation for the differences. However, it does make for a catchy title.

How Buoy Speeds compare with Ship Speeds

First, before we examine each of these statements, let's look at how buoy and ship winds compare in a climatic sense. Are buoy winds always less than ship winds?

One report studied all ships reporting within 100 km of a buoy for a large area off the U.S. East Coast during a five year period (Pierson,1990). ***Figure 1***, taken from Figure 17 of that paper, shows the average buoy speed for each one knot bin of reported wind speed by ships. The 45 degree diagonal shows the "no bias" line.

Ship observations are typically less than moored buoy winds when the buoys report less than 10 kts. Ships probably have a hard time observing really light winds because of the ship's motion. Ship and buoy winds show little mean difference in the range from 10 to 20 kts. Above 20 kts, the buoy winds exhibit a lower bias. The line gets more erratic at higher wind speed because of fewer cases of high wind.

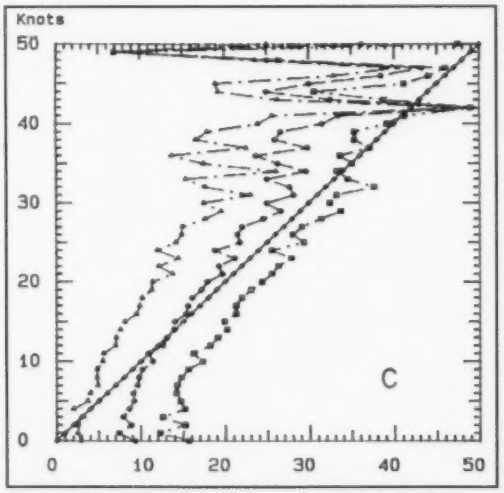


Figure 1. Counts for wind speed and direction for total sample for unclassified ships. Average plus and minus 1 standard deviation as explained in text. Marsden square 116.

Reproduced by permission of American Geophysical Union: Willard J. Pierson, Jr., Examples of Reasons for, and Consequences of the Poor Quality of Wind Data From Ships for the Marine Boundary Layer: Implications for Remote Sensing, Journal of Geophysical Research, Vol. 95, No. C8, Page 13,331, August 15, 1990.

Now, let's look at each of my earlier explanations for the lower buoy speeds:

The much lower anemometer heights are on the buoy since the speed increases with height

While this is true, the scientifically accepted profiles usually account for less than half of the observed difference in high wind speeds. When the air and sea surface temperature are about equal, or when the air temperature is colder than the sea surface temperature, the difference between the 5 m buoy height and a 30 m ship anemometer is only about 15%. This means that the 32 kts buoy report would become about 37 kts at 30 m versus the 45 kts ship observation. Consequently, the difference in anemometer height doesn't account for most of the observed differences.

Only when the air temperature exceeds the sea surface temperature by 4 degrees C or more do the profiles show that a 32 kts buoy wind would become a 44 kts 30 m wind. However, these conditions rarely happen during the higher wind speeds when the atmosphere is well mixed vertically. See http://www.coaps.fsu.edu/~bourassa/BVW_html/wind_profile.gif for sample vertical wind profiles.

Buoy motion and wave sheltering

Under most typical conditions, buoy motion does not affect the wind measurements. In 1984, a 3 m discus buoy was moored next to a Coastal-Marine Automated Network (C-MAN) station at Chesapeake Light to assess just such a question. Once adjusted for height differences, 98% of the wind speeds agreed within 4 kts during a month that feature wave heights to 3.6 m (Gilhousen, 1987). In a more recent study, wind speeds measured by a 3 m discus in the Gulf of Mexico compared favorably with those measured by a more stable, University of Miami spar buoy (Graber et. al., 2000). Speeds agreed within 2 kts when the significant wave height reached 3 m.

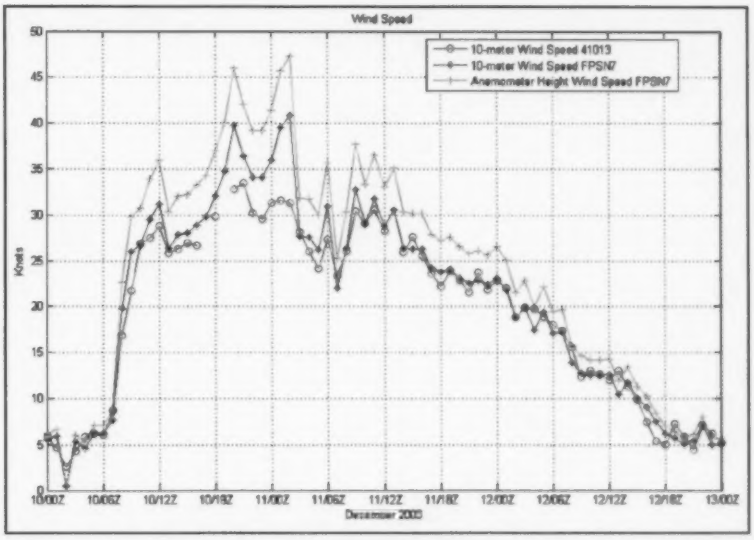


Figure 2 **Time series plot of the wind speeds centered around a developing Northeaster on Dec. 11, 2003.**

On the other hand, many forecasters believe that when the wave heights exceed 5 m, the anemometer height of most NDBC buoys, that sheltering reduces the wind speed. Some, but not all, evidence exists to back their conclusions.

Wind speeds from 46050 were compared to those observed at the Newport, OR C-MAN station over a 10-year period (Hervey, 1999) The comparison was limited to similar onshore wind directions. The buoy speeds looked 5–10% lower than the C-MAN winds when the wind speed exceeded 35 kts. On the other hand, during the high wind cases, the differences were not related to wave height.

Another interesting data set was recently collected when winds from a 3 m discus buoy at Frying Pan Shoals, NC, 41013, were compared with those from the nearby Frying Pan Shoals Light. ***Figure 2*** shows a time series plot of the wind speeds centered around a developing Northeaster on Dec. 11, 2003. Both the wind speed from the tower and those measured by the buoy were adjusted to 10 m. The agreement was within 2 kts until the peak of the storm when a 4–7 knot difference was observed. This correlates well to the time when the significant wave height topped 4.5 m. Since the excellent agreement resumed after the waves dropped below this height, wave sheltering is a plausible reason for the difference.

Finally, wind speeds measured by a research vessel were compared with buoy wind speeds when the ship was within 20 km of the buoy (Taylor et. al., 2002). The comparison took place off Newfoundland and included a case where the seas exceed 9 m. Once adjusted for height differences, the buoys' speeds compared quite well

over the entire range of conditions and averaged only 2–3% lower than the ship's anemometer.

Longer averaging periods

Buoy winds are averaged for 8 minutes to reduce the effect of buoy motion. Many believe that a longer average results in lower mean speeds. However, 2-minute averaged wind speeds were shown to be unbiased when compared with 8-minute average wind speeds at C-MAN stations (Powell, 1993). The 2-minute averages show more hour-to-hour variability. So, longer averaging periods do not account for the bias.

Degraded sensors or "buggy" computer software on the unattended buoy

Having worked with NDBC for the past quarter century, I have collected an amusing assortment of stories on what can go wrong with automated measurements. However, a systematic and thorough program of data quality minimizes these errors (see http://www.ndbc.noaa.gov/qc.shtml). All anemometers are tested in a wind tunnel to verify performance within specifications before deployment. Two anemometers are placed on each buoy and algorithms check to make sure that the duplicate measurements track together. Gust-to-speed ratios are flagged if they are unreasonable, and wind speeds are checked with the high frequency wave energy for agreement. Buoy winds are routinely compared with model analysis winds to ensure that biases are reasonable. Data analysts daily look at the data on weather maps and suspect lists then use a variety of computer graphics to detect degradations. National Weather Service meteorologists and web users also phone or e-mail their concerns. Degraded data are removed from real-time distribution and archival.

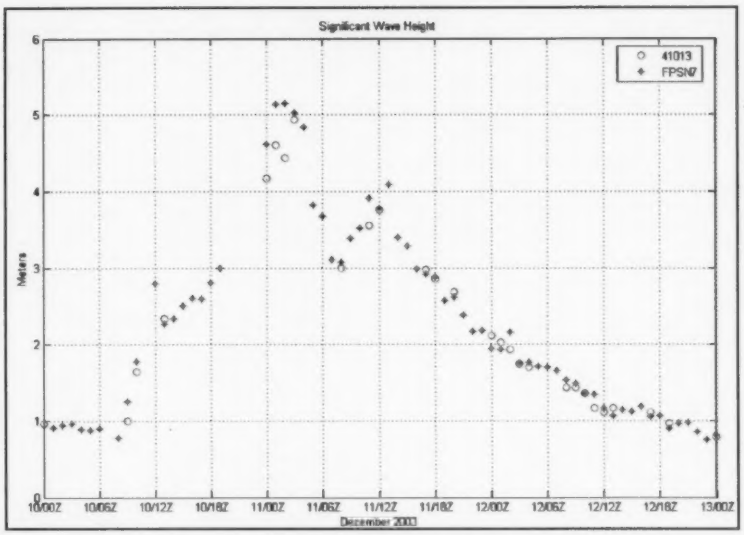


Figure 3. The ratio of the measured speed to the ambient speed.

Anemometer Exposure Issues

Finally, for those ships that do have anemometers, how does the exposure effect the measurement? Most forecasters believe that the prevalence of obstructions lower the speed, and that the ambient wind speeds are probably even higher. Recent studies by the Southampton Institute of Oceanography have modeled the airflow disturbances around a typical merchant ship. The ratio of the measured speed to the ambient speed is shown in ***Figure 3***. Typical locations for an anemometer, above the bridge and on a foremast, are areas where the speeds would be several percent higher than the ambient. So, a small part of the reason for the difference could be the anemometer siting on the vessel.

Other Factors

What other factors could cause the differences? First, the wind can change rapidly over small distances. Many deep winter storms feature eyes or thunderstorms where the speed can change drastically in a few miles. On any given day, the differences could be the result of a natural, spatial variation. On the other hand, this will not explain why the buoy winds, on average, are lighter than the ship winds above 20 kts.

Most ships don't have anemometers, and they use the Beaufort scale to estimate the wind speed from sea state photographs. This introduces human subjectivity to the process with unknown biases. I suspect that most of the differences between buoy and ship observations result from this subjective estimate.

The conclusion is anything but clear. A simple summary is that we have two different observing processes with varying characteristics resulting in biases that can't be completely reconciled. So ponder that next time you peer at a weather map.

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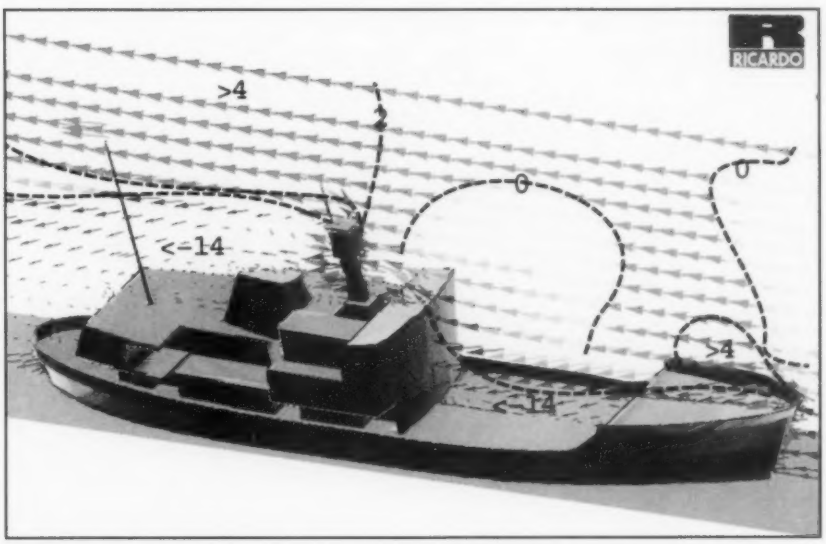


On the right, the ship disturbs the airflow—the anemometer will not measure the true value that the wind would have if the ship were not there. Using computer models, we can calculate the flow around ships and find out how big this error is, or we can place a model of the ship in a wind tunnel and measure the error for different wind directions. For further information on flow distortion studies see Yelland et al. (2002)

Yelland, M. J., B. I. Moat, R. W. Pascal and D. I. Berry, 2002: CFD model estimates of the airflow over research ships and the impact on momentum flux measurements, Journal of Atmospheric and Oceanic Technology, 19(10), 1477-1499.

When Do Ocean Waves Become 'Significant'? A Closer Look at Wave Forecasts

Tom Ainsworth, NOAA/National Weather Service Forecast Office, Juneau, AK

Anyone who has spent time on a vessel, large or small, can probably recall an encounter with significant waves. Of course, the size of wave that someone considers to be 'significant' is very subjective and dependent on the size of the vessel on which that person's encounter took place. When my family and I moved to Juneau a number of years ago, we sailed on the 408-foot Alaska State Ferry 'Matanuska' from Bellingham, WA. While crossing Queen Charlotte Sound off British Columbia in gale force winds on a Saturday afternoon, the ship rolled through seas I estimated to be 15- or 20-feet high on average. We were watching a movie in a theater room on the 4th deck when, out of the blue, the port side windows were slammed by a drenching wave. As the water poured off the deck and back into the Sound, my wife and I exchanged silent glances. Not long before this power-washing wave hit, people were outside our window gripping the rail and squinting with awe into the wind that required a forward lean and wide stance to maneuver through. Until that wave, our seats were at least 15 feet above the tops of the foaming wave crests. In my opinion, that solitary wave that hit the side of the 4th deck of the Matanuska was certainly a significant one. But the term 'significant wave height' has a specific definition, and anyone using marine weather information should have a clear understanding of what it means.

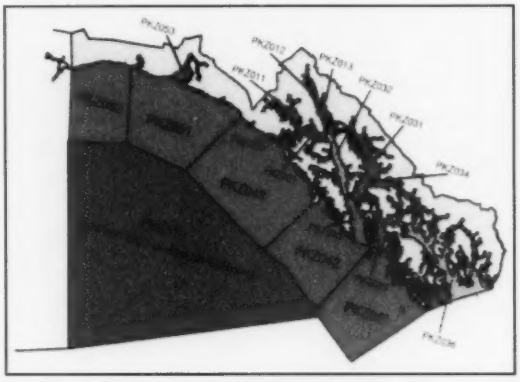
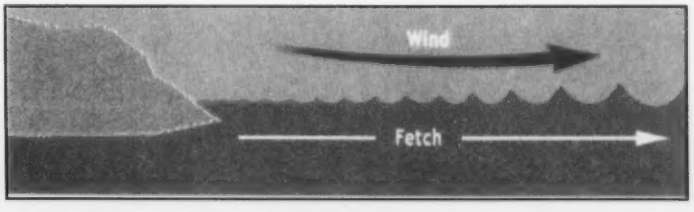


Figure 1. NOAA's National Weather Service Forecast Office (WFO) in Juneau is responsible for informing citizens about weather conditions over a 150,000 square mile area that includes the east half of the Gulf of Alaska and the entire Alaska Panhandle

NOAA's National Weather Service Forecast Office (WFO) in Juneau is responsible for informing citizens about weather conditions over a 150,000 square mile area that includes the east half of the Gulf of Alaska and the entire Alaska Panhandle. More than half of our forecast area is over water. Mariners on southeast Alaska waters comprise a large percentage of our audience and seek out weather information daily. This diverse audience is comprised of weekend recreational boaters, commercial fishers, and large passenger ships. WFO Juneau's marine weather forecasts include information about prevailing wind speed and direction and significant wave height. As we head toward the warmer months of the year, when southeast Alaska waters become more populated, let's review basic ocean wave characteristics so that mariners can interpret marine weather forecasts as NWS forecasters intended. (***Figure 1.***)

Wave Formation: Waves are formed by wind blowing along the water's surface. Wave height is dependent on a) wind speed; b) fetch length; and c) duration of time the wind blows consistently over the fetch. (***Figure 2.***)

Wind 'fetch' is the distance the wind blows over water with similar speed and direction. Higher wind speeds blowing for long periods of time over longer stretches of water result in the highest waves. Waves that are the direct result of the local wind are called wind waves. Wind waves are short, choppy, and tend to break (white cap) when winds reach about



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Graphic courtesy of Tammy Pelletier, WA State Dept of Ecology

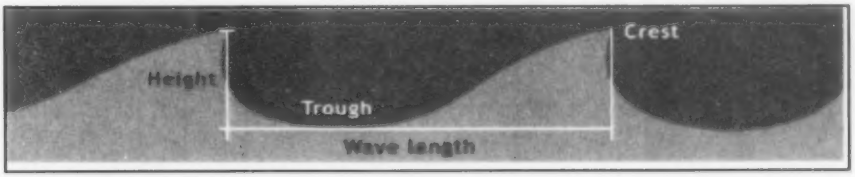
12 knots. These are the most common waves on lakes, ponds and in the confined, narrow stretches of southeast Alaska's inner channels.

Wave pattern considerations become more complex in the Open Ocean and Gulf of Alaska. Waves are still formed by the local wind, but, once formed, ocean waves can continue to travel along great circle routes for thousands of miles. Waves that travel outside of their generation area and are no longer the result of the local wind are called "swell." Compared to wind waves, swell have smoother crests. Over time, swell "packets" or "groups" travel great distances, converge with other waves caused by distant storms traveling in different directions, and refract off coastlines. Therefore, the ocean surface is comprised of thousands of interacting waves that originated in different places and traveled in different directions at different speeds. This is known as a "wave spectrum"—a combination of waves with different heights, frequencies and direction of movement.

In southeast Alaska, the wave spectrum, or range of wave heights, is different in the inner channels than it is in the open Gulf. The inner channels are dominated by wind waves, and, except for near entrances to the open ocean, experience fewer swell. The open Gulf contains a broader range of wave heights.

Wave Dimensions: The magnitude of a wave is determined by three components: height, length, and period (or frequency). A fourth wave component is steepness. Wave height is the distance measured from the trough to the crest of the wave. Wave length is the distance between successive crests (or troughs) (***Figure 3***). Wave period is the time that elapses between the passing of successive crests (or troughs). Wind waves tend to have smaller heights and have shorter periods than swell. Wave steepness is the slope determined by the ratio between wave height and wave length. When wind wave heights and periods are close to the same value (e.g., six foot seas every six seconds), wave steepness is severe and pitch poling becomes a real possibility for smaller vessels, as does capsizing in beam seas. The farther waves move away from their source region, the more their wave length and period gradually increase. Therefore, waves with long periods, greater than 10 or 12 seconds, are arriving from a distant source and are considered swell.

Significant Wave Height: By now you know a wave spectrum is an extremely complex fluid phenomenon. The spectrum is literally made up of waves on top of waves (on top of waves!). It is extremely important for mariners to understand how this spectrum of wave heights is conveyed in marine weather information. The wave height value in a forecast, and reported by ships and buoys, is called the significant wave height. Significant wave height (H_s) is defined as the average height of the highest one-third waves in a wave spectrum. This happens to correlate very well with the wave height a skilled observer perceives in a wave spectrum.



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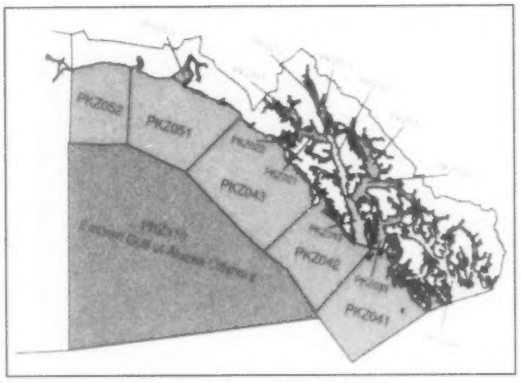

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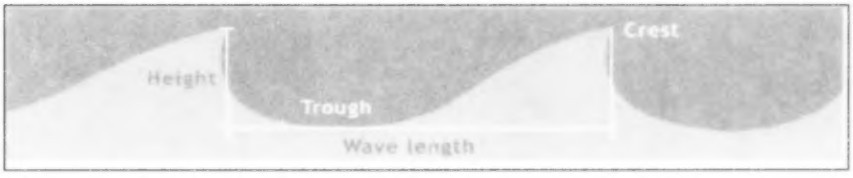


Figure 3. Wave height is the distance measured from the trough to the crest of the wave. Wave length is the distance between successive crests (or troughs).
Graphic courtesy of Tammy Pelletier, WA State Dept of Ecology

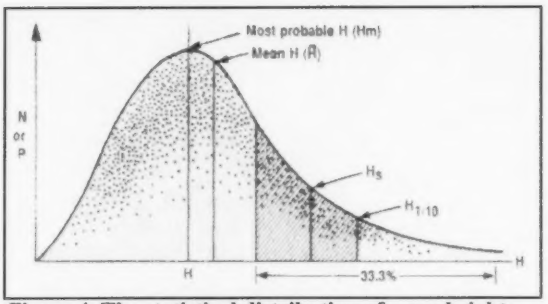


Figure 4. The statistical distribution of wave heights showing various parameters
(from Bretschneider, 1964)

What do we mean by "highest one-third waves"? Remember, a wavy water surface is comprised of thousands of interacting waves that originated in different places and traveled in different directions at different speeds. If a person could filter out and plot on a graph all of the waves that make up a spectrum, the distribution of waves with different heights would result in a "bell curve" graph similar to the one in the figure above. Each dot represents the number of waves (N) in the spectrum with a height of H. The graph shows there are a relatively low number of small waves (left side of graph) and a low number of very large waves (right side of graph). The greatest number of waves (N) in this spectrum falls in the mid range of heights (centered under Hm). The highest one-third (33.3%) number of waves in this spectrum is shaded on the graph. The average height of waves in this shaded group is the significant wave height, Hs.

Also shown are the mean wave height (H), most probable wave height (H_m), and the height of the highest 10% of waves ($H^{1/10}$). The mean wave height H is approxiinately equal to 2/3rds (0.64) the value of H_s and $H^{1/10}$ is approximately equal to 1.27 times the value of H_s. In addition, the height of the highest 1% of waves ($H^{1/100}$) is approximately equal to 1.67 times H_s, and a theoretical maximum wave height (H_{max}) is approximately equal to two times H_s.

Quiz Time! Let's take a minute and put all these wave heights that we have learned about into perspective by practicing how to derive pertinent wave characteristics. If you read a marine weather forecast predicting "SEAS 10 FT," what is really being conveyed in that forecast?

H_s = 10 ft

H (mean) = (0.64)Hs = 6.4 ft

H (most probable) = 6 ft

$H^{1/10}$ (10% highest waves) = $(1.27)H_s$ = 12.7 ft

$H^{1/100}$ (1% highest waves) = $(1.67)H_s$ = 16.7 ft

H_{max} (highest wave you should be on the alert for) = 20 ft!

Mariners should know the physical limits of their vessels—both wind speed limits and wave height limits. The marine weather forecasts provide both wind velocity (speed and direction) information and wave height information. Wave height values, both predicted and observed, are defined as the significant wave height, denoted as H_s. Hs is not a single value by any means but rather a value which represents a range of heights occurring in a wave spectrum from approximately 60% of Hs to 200% of H_s! This range is somewhat less in narrower inland channels, where the contribution of ocean swell is less. Mariners can reduce their risk of encountering bigger than expected waves by understanding the range of wave heights in a spectrum defined by a particular significant wave height. The wave that crashed into the 4th deck of the Matanuska ferry some years ago, while crossing Queen Charlotte Sound, was within the range of H_{max} for a spectrum of waves whose mean height is 15 feet. Mariners must not focus on a single significant wave height value in a forecast or observation but recognize the concept of the wave spectrum.

AMVER/SEAS Communication Changes

Effective 01 May, 2006, the original transmission address to submit Binary and code 41 observations via COMSAT (now TELENOR) **is terminated**. The original address of 31102030798481 needs to be changed to a Special C address. This new address setup procedures are specific to the type of Inmarsat C transmitter you have installed onboard.

Please verify that your transmission setup is showing the latest address, because after 01 May, any observation sent to the 3110 address WILL NOT be delivered to the National Weather Service.

For more information or assistance, please contact your local PMO or visit vos@noaa.gov

Thanks, Luke (VOS Operations Manager)

IMPORTANT

AMVER/SEAS COMMUNICATION
TRANSMISSION PROCEDURES CHANGED

********** **IMPORTANT** **********

1. It is necessary to setup an address for the AMVER/SEAS message in the Standard C software. The SETUP procedure provided below is a one-time process to be completed on initial installation.
2. The TRANSMISSION instructions provided below are to be followed each time a message is transmitted.
3. These instructions may vary slightly, depending on the software version and hardware.

****

BINARY Procedures

THRANE AND THRANE SOFTWARE ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR) AND INDIAN OCEANS (IOR) PROCEDURES

SETUP PROCEDURES

1 At the MAIN MENU highlight APPLICATION option and Press . Select ADDRESS BOOK and Press <ENTER>.Select NEW in Address Book and Press <ENTER>.

2. At the EDIT ADDRESS section type in NEW NAME of file. (Example name: AMVER/SEAS and Press <ENTER>

   - There is a DOT in front of the TELEX [(.) Telex] located on the right side of the screen. Move the DOT to SPECIAL by using the Arrow key. Once the SPECIAL is Highlighted, press the SPACE BAR. (This will place the DOT in the SPECIAL Address)
   - The terminal defaults to 7 Bit for all services, use the space bar to select 8-BIT. Press <ENTER>
   - At the Bottom of the screen a Box will appear to enter the SPECIAL ACCESS CODE. Type in the word SEAS in this field and Press <ENTER>.
   - Tab to "OK". Press <ENTER>. (The Address is now saved)
   - Press ESC twice to reach the Main Menu.

SETUP AND TRANSMISSION PROCEDURES

1. At the MAIN MENU highlight TRANSMIT and Press <ENTER>. Press the space bar to open the Address book with the address created during setup.
2. Highlight AMVER/SEAS address file and Press <ENTER>
3. The cursor should be on the Land Station field. Press the space bar to view the station list. Highlight the correct CES/LES and Press <ENTER> to accept.

AOR (W)	Southbury	001
AOR (E)	Southbury	101
POR	Santa Paula	201
IOR	Eik (Oslo)	304

********** **No other stations can relay the messages** **********

4. Tab the cursor to the "TEXT IN EDITOR" field which will be marked with an "X". Press the space bar to remove the "X" and the word "FILE" will appear.
5. Highlight the FILE option and press the space bar to display a list of files located on the diskette. Highlight the appropriate file name and press <ENTER>.
6. Highlight the REQUEST CONFIRMATION option and press the space bar to remove the "X". Move the cursor to SEND and press <ENTER>.

NOTE: The following are the FILE NAME for each particular message.

--Meteorological Observation	MET.BIN
--Sail Plan	SP.BIN
--Arrival Report	FR.BIN
--Deviation Report	DR.BIN
--Administrative Report	ADMIN.BIN

TRIMBLE SOFTWARE
ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR) AND INDIAN OCEANS (IOR) PROCEDURES

SETUP PROCEDURES

1. At the MAIN MENU highlight SETUP option and press <ENTER>. Select MAIL ADDRESS and Press <ENTER>. Select INSERT MAIL ADDRESS and Press <ENTER>. Press <ENTER> twice to display the EDIT ADDRESS Screen.
2. At the EDIT ADDRESS section the ENTER NAME FILE will appear and enter AMVER/SEAS (This is the name of the file).
   - Tab to PRESENTATION, this field defaults to IA5 (7-bit. All Networks.) Press <ENTER> to view options. Select BINARY (8-Bit, No Telex)
   - Tab to DATA FORMAT field. The STANDARD (All Presentations) is displayed as the default. If not selected, press enter to view options. Select Standard (All Presentations.) Press <ENTER>.
   - Tab to PREFIX FIELD and type in SEAS into this field. (This is the SPEC ACCESS CODE). Leave the Country Code, Destination, and Extension fields BLANK.

- Tab to CES/LES and press <ENTER>. Select the appropriate Land Station corresponding to your ships location press <ENTER>.

AOR (W)	Southbury	001
AOR (E)	Southbury	101
POR	Santa Paula	201
IOR	Eik (Oslo)	304

********** **No other stations can relay the messages** **********

- At the DELIVERY NETWORK select SPEC ACCESS CODE and Press <ENTER>.
- Press ESC to exit the Edit Address menu, continue to press ESC until the program returns to the Main Menu. The AMVER/SEAS address is now saved in the Address Book and is available for transmission of meteorological observations.

SETUP AND TRANSMISSION PROCEDURES

1. Place DATA DISK in TRIMBLE INMARSAT "C".
2. Select SETUP from Main Menu <ENTER>. Highlight FILE DIRECTORY SETUP <ENTER>. At Directory Setup ensure the first line (MESSAGE DIRECTORY) indicates only A:\
3. At MAIN MENU select COMPOSE <ENTER>. Highlight SEND MESSAGE <ENTER>. Message will appear (MET.BIN) or Other Appropriate File <ENTER>.
4. At the ADDRESS INDEX highlight the entry AMVER/SEAS <ENTER>
5. Select MSG OPTION highlight SEND MESSAGE <ENTER>. A message will be displayed letting you know that the Message was put in the outgoing mailbox.

NOTE: The following are the FILE NAME for each particular message.

--Meteorological Observation	MET.BIN
--Sail Plan	SP.BIN
--Arrival Report	FR.BIN
--Deviation Report	DR.BIN
--Administrative Report	ADMIN.BIN

JRC (JAPAN RADIO COMPANY)
ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR) AND INDIAN OCEANS (IOR) PROCEDURES

SETUP AND TRANSMISSION PROCEDURES

1. At the MAIN MENU select TRANSMIT. Select SPECIAL ACCESS NETWORK and Press <ENTER>.
   - The SPECIAL ACCESS NETWORK window appears. Press <ENTER>. Type in the word SEAS and Press <ENTER>.
   - Ensure FILE NAME: A:\MET.BIN (Or Other Appropriate File) By using A:\ you are telling the program to read the file on the diskette and not the text in editor.

- Arrow down to LAND EARTH STATION and Press <ENTER>. Type in your LES/CES CODE corresponding to your ships location and press <ENTER>

AOR (W)	Southbury	001
AOR (E)	Southbury	101
POR	Santa Paula	201
IOR	Eik (Oslo)	304

******** No other stations can relay the messages ******************

- Ensure POSITION: OFF
- Arrow down to CHARACTER CODE <ENTER>. Use the Arrow key to Highlight DATA. (Ensure this is completed, because you are transmitting a Binary message)
- Arrow down to DELIVERY CONFIRMATION and Press <ENTER>. Use the Arrow Key to highlight OFF and Press <ENTER>.

2, Press F1 (This will SEND THE MESSAGE).

NOTE: The following are the FILE NAME for each particular message.

--Meteorological Observation	MET.BIN
--Sail Plan	SP.BIN
--Arrival Report	FR.BIN
--Deviation Report	DR.BIN
--Administrative Report	ADMIN.BIN

FURUNO SOFTWARE
ATLANTIC (AOR-E), (AOR-W), PACIFIC (POR) AND INDIAN OCEANS (IOR) PROCEDURES

NOTE: Furuno first started installing the *FELCON 11* model hardware in the middle 90's for their version of the INMARSAT "C" to work with the GMDSS. This model could not generate a Binary message to be used with our AMVER/SEAS software.

The Furuno company has updated their hardware to the *FELCOM 12*. This new hardware will allow an AMVER/SEAS Binary message to be transmitted on their INMARSAT "C"

SETUP PROCEDURES

1. At the FURUNO Main Menu, Press F8 (SETUP). The SETUP WINDOW menu comes up on the screen.
2. Select NO.9 (CONFIGURATION) and Press <ENTER>. Select NO.1 (STATION LIST) and press <ENTER>. Arrow down to a blank file number at the end of the list and Press <ENTER>.
3. A window appears asking for: Use <ENTER> when line is highlighted to type in information and press to accept typed in data. Use arrow keys to get to next line.
   - Station Name: Enter—-AMVER/SEAS
   - Arrow down to DESTINATION TYPE: Select SPEC
   - Arrow down to STATION ID: Enter in the word SEAS. Leave the Prefix and Country Code Blank.
   - Arrow down to REMARKS: Enter AMVER/SEAS, and press <ENTER>.
4. Press ESC until you return to the FURUNO MAIN MENU.

SETUP AND TRANSMISSION PROCEDURES

1. Insert the diskette with the BINARY message that was generated with the AMVER/SEAS program.
2. Press F3 (TRANSMIT). Select NO. 1 (TRANSMIT MSG) and Press <ENTER>. The Transmit Message window appears.
    - Arrow DOWN to MESSAGE FILE and Press <ENTER>. This will allow you to see the files stored on the diskette. Select the APPROPRIATE FILE message and Press <ENTER>.
    - Arrow DOWN to STATION NAME and Press <ENTER>. Select STATION AMVER/SEAS and Press <ENTER>.
    - Arrow DOWN to CES/LES ID and Press <ENTER>. Select the proper LES/CES and Press <ENTER>. AOR (W) Southbury 001, AOR (E) Southbury 101, POR Santa Paula 201 and IOR Eik (Oslo) 304.
    - Arrow DOWN to OPTION and Press <ENTER>. Arrow down to CONFIRMATION and select OFF and Press <ENTER>. Arrow down to CODE and Press <ENTER>. Select the word DATA and Press <ENTER>. (Ensure DATA is selected, because the AMVER/SEAS message is sent as a BINARY message.)
    - Press . Arrow DOWN to TRANSMIT and Press <ENTER>. A small SEND START window appears and SELECT YES and Press <ENTER>. The message is now being sent through the satellite.
3. To see the Status of the Message being sent Press F6 (LOGS).

NOTE: The following are the FILE NAME for each particular message.

--Meteorological Observation	MET.BIN
--Sail Plan	SP.BIN
--Arrival Report	FR.BIN
--Deviation Report	DR.BIN
--Administrative Report	ADMIN.BIN

CODE 41 Procedures

Thrane and Thrane Code 41 Procedures

**********IMPORTANT **********

1. It is necessary to setup an address for the Code 41 message in the Standard C software. The SETUP procedure provided below is a one-time process to be completed on initial installation.
2. The TRANSMISSION instructions provided below are to be followed each time a message is transmitted.
3. These instructions may vary slightly, depending on the software version and hardware.

****

SETUP PROCEDURES

1. At the **MAIN MENU** highlight **APPLICATION** option and Press <ENTER>. Select **ADDRESS BOOK** and Press <ENTER>. Select **NEW** in Address Book and Press <ENTER>.
2. At the **EDIT ADDRESS** section type in **NEW NAME** of file. (Example name: WEATHER OBS) and Press <ENTER>.

- There is a DOT in front of the **TELEX** [() **Telex**] located on the right side of the screen.
- Move the DOT to **SPECIAL** by using the Arrow key. Once the **SPECIAL** is Highlighted Press the **SPACE BAR**. (This will place the DOT in the SPECIAL Address)
- At the Bottom of the screen a Box will appear to enter the **SPECIAL ACCESS CODE**. Enter the number **41** and Press <ENTER.
- Set the **BIT to 7**, if it is not already done and Press <ENTER>.
- The **CURSOR** should be at "**OK**". Press <ENTER>. (The Address is now saved).

TRANSMISSION PROCEDURES

1. At the **MAIN MENU** highlight **FILE** and Press <ENTER>. Select **NEW ASCII** or **NEW TELEX** and Press <ENTER>. Type in your Meteorological Observation in the proper format.

2. When finished entering the Observation Press **ESC** and this will return to the Main Menu. At the **MAIN MENU** highlight **FILE** and Press <ENTER>. Arrow down to **SAVE** and Press <ENTER>. Name the FILE on the MSG such as "**WEATHER OBS**"and Press <ENTER>.

3. At the **MAIN MENU** highlight **TRANSMIT** and Press <ENTER>. Select **SEND** and Press <ENTER>. (This will transmit the MSG) NOTE: Please turn the **CONFIRMATION OFF**.

    - When completing the Next Observation go to FILE and Press <ENTER>. Highlight LOADFILE and select the previous Observation BBXX and EDIT the same file and Transmit the file.

Trimble Code 41 Procedures

********** **IMPORTANT** **********

1. It is necessary to setup an address for the Code 41 message in the Standard C software. The SETUP procedure provided below is a one-time process to be completed on initial installation.

2. The TRANSMISSION instructions provided below are to be followed each time a message is transmitted.

3. These instructions may vary slightly, depending on software version and hardware.

****

SETUP PROCEDURES

1. At the **MAIN MENU** highlight **SETUP** option and press <ENTER>. Select **MAIL ADDRESS** and Press <ENTER>. Select **INSERT MAIL ADDRESS** and Press <ENTER>. Press <ENTER> twice to display the **EDIT ADDRESS** Screen.

2. At the **EDIT ADDRESS** section the **ENTER NAME FILE** will appear and enter **WEATHER OBS** (This is the name of the file).

    - Tab to **PRESENTATION** and select 7-BIT and Press <ENTER>
    - Tab to **DATA FORMAT** and select **STANDARD** (All Presentation) and Press <ENTER>
    - Tab to **PREFIX FIELD** and type in 41 into this field. (This is the **SPEC ACCESS CODE** 41 for Meteorological Observations) Leave the Country Code, Destination, and Extension fields blank.
    - Tab to **CES/LES** section and select the appropriate **CES/LES** from the list displayed and press <ENTER>.
    - At the **DELIVERY NETWORK** select **SPEC ACCESS CODE** and Press <ENTER>

- Press **ESC** to exit the Edit Address menu, continue to press **ESC** until the program returns to the Main Menu. The Code 41 is now saved in the Address Book and is available for transmission of meteorological observations.

TRANSMISSION PROCEDURES

1. At the **MAIN MENU** highlight **COMPOSE** and **CREATE/EDIT** and Press <ENTER>. Select **CREATE NEW MESSAGE** and Press <ENTER>. Type in your Meteorological Observation in the proper format. Press **ESC** and Save Changes (YES) and Press <ENTER>. Save **MSG** to File and Place a Name on MSG such as OBS.
2. **ESC** to **MAIN MENU** and highlight **SEND** and Press <ENTER>. The screen lists the files in the directory. Highlight **OBS** (Name of Msg) and Press <ENTER>. The **ADDRESS** Selection screen appears and select **WEATHER OBS** for the ocean area (LES) your ship is located and press <ENTER>.
3. The Message Information and Select Message options screen will appear. Highlight Send Message and Press <Enter>. A message will be displayed letting you know that the Message was put in the outgoing mailbox.

JRC (Japan Radio Company) Code 41 Procedures

********** **IMPORTANT** **********

1. It is necessary to set up an address for the Code 41 message in the Standard C software. The SETUP procedure provided below is a one-time process to be completed on initial installation.
2. The TRANSMISSION instructions provided below are to be followed each time a message is transmitted.
3. These instructions may vary slightly, depending on the software version and hardware.

****

SETUP PROCEDURES

1. At the **MAIN MENU** highlight **EDIT** and Press <ENTER>. A small window will appear in the middle of the Main Menu Screen. Select **EDIT ASCII FILE** and Press <ENTER>.
   - A small window appears which is called **EDIT ASCII FILE.** At the cursor enter a file name: "**WEATHER OBS**" and Press <ENTER>.
2. The next screen will allow you to **EDIT** a message. Type in your Meteorological Observation in the proper format. (BBXX). Press **F9** (This SAVES the information). Press **ESC** (Go back to Main Menu).

TRANSMISSION PROCEDURES

1. At the **MAIN MENU** select **TRANSMIT**. Select **SPECIAL ACCESS NETWORK**. and Press <ENTER>.
   - The **SPECIAL ACCESS NETWORK** window appears. Press <ENTER>. Type in the number "**41**" and Press <ENTER>.
   - Arrow down to **LAND EARTH STATION** and Press <ENTER>. Type in your **LES/CES ID** and Press <ENTER>. (Your LES/CES ID will be determined by your location in relation to the FOOT PRINT of the satellite.)
   - Arrow down to **DELIVERY CONFIRMATION** and Press <ENTER>. Use the Arrow Key to highlight **OFF** and Press <ENTER>.

2. Press F1 (This will SEND THE MESSAGE).

   •When completing the Next Observation go to EDIT the ASCII FILE and EDIT the previous Observation BBXX and SAVE the FILE and SEND the message through the SPECIAL ACCESS NETWORK.

Furuno Code 41 Procedures

********** **IMPORTANT** **********

1. It is necessary to setup an address for the Code 41 message in the Standard C software. The SETUP procedure provided below is a one-time process to be completed on initial installation.
2. The TRANSMISSION instructions provided below are to be followed each time a message is transmitted.
3. These instructions may vary slightly, depending on the software version and hardware.

****

SETUP PROCEDURES

1. At the **NORMAL STANDBY** Position Press **F1 (FILE).** A small window will appear and Highlight **No. 1**: **New (ALT-N)** and Press <ENTER>.
   - A larger window appears. At the cursor type in your Meteorological Observation in the proper format. (BBXX) Press **F1 (SAVES MESSAGES)**.
   - A small window appears. Arrow down to 5: **(SAVE ALT-S)** and Press <ENTER>.
   - A small window appears in the upper left corner titled **SAVE FILE NAME**. Enter a Name on the file such as "**WEATHER OBS**" and Press <ENTER> (SAVED MESSAGE).

TRANSMISSION PROCEDURES

1. Press **F3 (SEND/REC)**: A small window appears in upper left corner. Highlight No.1 (SEND) and Press <ENTER>.
   - Another window appears to the right of TITLE TO SEND MESSAGE. Highlight **No. 1 (SEND MESSAGE)** and Press <ENTER>.
2. The SEND MESSAGE window appears.
   - Arrow down to **DESTINATION TYPE** and Highlight "**SPEC**".
   - Arrow down to **STATION ID** and Type in "**41**".
   - Arrow down to **CES ID** and type in the **LES/CES ID**. (Your LES/CES ID will be determined by location in relation to the FOOT PRINT of the satellite.)
   - Arrow down to **CONFIRMATION** and select **OFF** and Press <ENTER>.
3. A small window appears titled **SEND START**. Highlight **YES** and Press <ENTER>.
   - At the bottom of the screen it will say: MESSAGE IS ENTERED IN SENDING BUFFER.
   - A window will appear saying: **SUCCESSFUL SENDING MESSAGE**.
   - The lower left corner of the screen will show the **STATUS** of the message.
4. When completing the Next Observation go to FILE and to OPEN and Press <ENTER>. Highlight the last WEATHER OBS message and Press <ENTER>. EDIT the last message and TRANSMIT the message.

Proposed Changes to U.S. Weather and Navigation Broadcasts via NAVTEX

Reprinted with permission from NOTICE TO MARINERS No. 8, 25 February 2006

The U.S. Coast Guard, in coordination with the National Weather Service, is proposing to modify the broadcasting of Maritime Safety Information (MSI) via NAVTEX, as detailed. This change is necessary in order to reduce the potential of delayed or missed broadcasts of MSI due to the large amount of information broadcast within the six daily broadcast slots for each NAVTEX station.

Currently, Meteorological Forecasts are broadcast four times per day and rebroadcast twice per day. Meteorological warnings are broadcast upon receipt and at the next routine scheduled time until canceled. Navigational Warnings are broadcast at the next available broadcast slot and rebroadcast in all subsequent slots as long as they remain in force.Under the proposed change, Meteorological Forecasts would no longer be rebroadcast. These two time slots would be allocated to rebroadcasts of Navigational Warnings. The proposed elimination of previously broadcast Meteorological Forecasts and reduction in repeated Navigational Warnings will reduce the potential of delayed or missed broadcasts of MSI.

The U.S. Coast Guard invites mariners to comment on this proposed change by May 1, 2006. Please send comments to rlevin@comdt.uscg.mil or telephone 202-475-3555.

Approved changes will be announced for at least 60 days prior to implementation.

Proposed changes to Atlantic Ocean, Gulf of Mexico, and Puerto Rico NAVTEX broadcast schedules:

Station	Identifier	WX Broadcast Schedule (UTC)
Boston	F	0045, 0445, 0845[1], 1245, 1645, 2045[1]
Chesapeake	N	0130, 0530, 0930[1], 1330, 1730, 2130[1]
Savannah	E	0040, 0440, 0840[1], 1240, 1640, 2040[1]
Miami	A	0000, 0400, 0800[1], 1200, 1600, 2000[1]
San Juan	R	0200[1], 0600, 1000, 1400[1], 1800, 2200
New Orleans	G	0300[1], 0700, 1100, 1500[1], 1900, 2300

[1] Repeated Navigational Warnings and no Weather normally broadcast at these times.

Proposed changes to Pacific Ocean, Kodiak Alaska, Hawaii, and Guam NAVTEX broadcast schedules:

Station	Identifier	WX Broadcast Schedule (UTC)
Kodiak[2]	J X	0300, 0700, 1100[1], 1500, 1900, 2300[1] 0340, 0740, 1140[1], 1540, 1940, 2340[1]
Astoria	W	0130, 0530, 0930[1], 1330, 1730, 2130[1]
Point Reyes	C	0000, 0400[1], 0800, 1200, 1600[1], 2000
Cambria	Q	0045, 0445[1], 0845, 1245, 1645[1], 2045
Guam	V	0100, 0500[1], 0900, 1300, 1700[1], 2100
Honolulu	O	0040, 0440, 0840[1], 1240, 1640, 2040[1]

[1] Repeated Navigational Warnings and no Weather normally broadcast at these times.

[2] Kodiak also broadcasts weather forecasts during time slots initially allocated to Adak.

Canadian Beacon—Operation Unison

Story and photos by PA3 Christopher Evanson, U.S. Coast Guard, Atlantic Area
Reprinted with permission from the Coast Guard Magazine, Katrina The Gulf Response, Special Edition 2005

An unfamiliar vessel sailed through the warm tropical waters off the coast of Key West, Fla. The hull made of double reinforced steel, red as an apple, prominently displaying a maple leaf for the world to see.

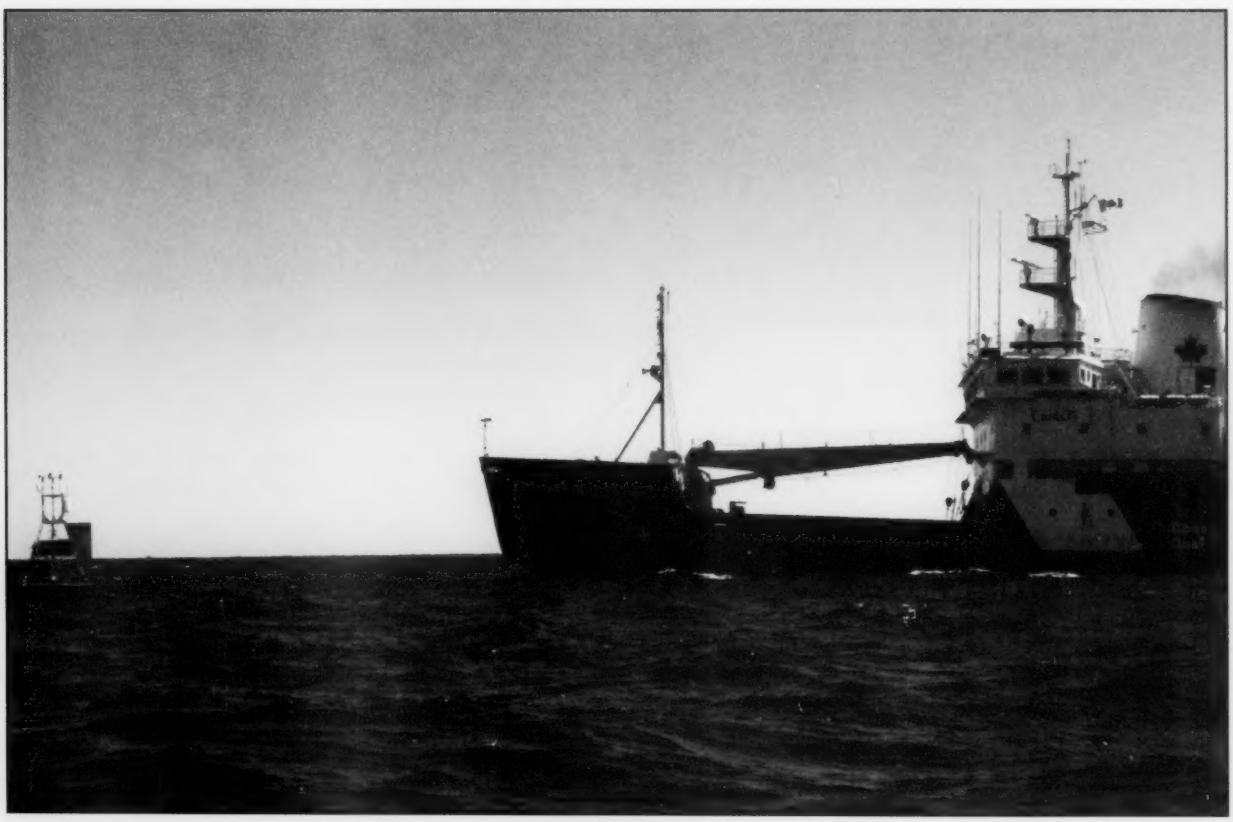
It was the Canadian coast guard ship Sir William Alexander, homeported in Halifax, Nova Scotia. The Sir Alexander is a 280-foot icebreaking buoy tender that normally spends many winters laboring in the frigid ice-covered waters of the North Atlantic.

But this trip put the ship and its civilian crew far from home, steaming down the Atlantic Coast to aid their neighbors to the south, days after a nasty storm had taken a bite out of the States.

The Sir Alexander began its long voyage on Sept. 6, to aid and assist the Coast Guard in any way possible as the Gulf Coast lay in ruins after being devastated by Hurricane Katrina. The mission was called Operation Unison.

Upon arriving in Pensacola, Fla., eight days later, the ship brought relief supplies to aid victims affected by Katrina and a fresh crew ready to get to work.

One week prior to the Alexander arriving in U.S. waters, and before



Nor'easter

The Canadian coast guard ship Sir William Alexander, homeported in Halifax, Nova Scotia, approaches a damaged weather buoy off the North Carolina coast. Weather buoys provide early indications of potential hurricanes. The Sir Alexander assisted the U.S. Coast Guard with repairing damaged buoys in the wake of Hurricane Katrina.

Katrina made landfall, winds reached record speeds in the Gulf of Mexico, causing damage to oil rigs and several weather and navigation buoys vital to United States commerce.

"Weather buoys help calculate weather, such as wind speed, wave data, humidity, and barometric pressure. The navigation buoys assist in the safe transit of vessels entering ports along the Gulf Coast," said Patrick Bergen, an electronics technician with the National Oceanic Atmospheric Administration's National Data Buoy Center.

"Weather buoys are absolutely valuable to the country because they are part of the hurricane warning system," said Ward Posey, chief of aids to navigation operations for Atlantic Area.

Soon after the Sir Alexander arrived, the mission was clear. Their orders were to replace and repair damaged weather buoys, with the help of two NOAA technicians.

The Canadian coast guard crews allowed the Coast Guard to focus solely on repairing navigational aids and get some much needed rest.

"The Sir Alexander allowed us to give our cutters the maintenance that they needed," said Posey. "The crews lived in much of the areas affected by the storm, and many had family matters to tend to," he said.

The presence alone for the Sir Alexander was very historic.

"This was the first time the Canadian Coast Guard worked in the Gulf of Mexico," said Bryon Gibbons, Commanding Officer of the Sir Alexander. For starters, the Sir Alexander primarily is an icebreaker; it is very rare that a ship with those capabilities would be needed in a warm, humid climate.

Unlike their U.S. counterparts, the Canadian Coast Guard is made up entirely of civilians. The ship operates with a small crew that functions like a well-oiled machine.

Many Coast Guard cutters are staffed with junior officers and junior enlisted fresh out of the Academy or boot camp. But on the Sir Alexander, the 30-man crew has over 300 years of sea service combined.

"You would be hard-pressed to find anyone on this ship with less than twenty years of sea experience," said

Canadian Help
The crew of the Sir William Alexander, homeported in Halifax, Nova Scotia, pose for a group photo prior to their arrival back in Canada.

Bob Billard, a quartermaster aboard the Sir Alexander.

The day-to-day business is similar to how the Coast Guard operates. There is a commanding officer and an executive officer that the crew refers to as the chief mate. The deck department consists of six seamen and a chief boatswain who observes the daily deck work.

The engineering department consists of a chief engineer, oilers and winch men who maintain six-hour watches in the engine room. On the bridge there is always one lookout, a quartermaster, and an officer-in-charge standing watch. The Sir Alexander is also equipped with a helicopter flight deck and hangar.

After receiving the call for assistance, the Canadian coast guard serviced and repaired six weather buoys over a one-month period ranging from the Alabama coast to Honduras.

When their mission was completed in the Gulf and Caribbean, the crew made a port call to Key West, Fla., for an evening before departing on the last leg of the mission, sailing up the Atlantic coast towards Halifax. Three more weather buoys awaited the crew before going home: two off the coast of North Carolina and the last off the Maine coast.

The crew of the Sir Alexander talk very little while they work. The years of experience that each man has make it seem like they can read each other's minds. They each have purpose and poise that come from more than a quarter century of sea time.

As the crew sailed toward home, the environment became more familiar to them. The air was a little crisper, and the seawater was a little darker; Canada was close by. The crew of the Sir Alexander, well aware that they were on a historic trip, did not view the U.S. operations any differently than they would their own. One crewmember, steward Russell Mosher, said it best. "This isn't Canada helping the U.S. It's brother helping brother."

Weather Update
Two technicians with the National Oceanic Atmospheric Administration National Data Buoy Center in Stennis Space Center, Miss., repair a weather buoy off the North Carolina coast damaged by Hurricane Katrina. The two technicians traveled with the Canadian Coast Guard ship Sir William Alexander, a 180-foot ice breaking buoy tender homeported in Halifax, Nova Scotia.

The Seventh Leg in the Last Whitbread Round the World Race

Frits Koek, Royal Netherlands Meteorological Institute (KNMI)
Images courtesy of Richard Langdon, Ocean Image,s www.oceanimages.co.uk

Preamble

Every four years, a number of yachts take part in the Volvo Ocean Race (VOR), previously known as the Whitbread Round The World Race (WRTWR). Around mid-April this year, the yachts of the VOR 2005–2006 will arrive in Baltimore. This time they will come in from the southern hemisphere—Rio de Janeiro was the previous port—instead of what was usually the case, from Fort Lauderdale or Miami. The other difference is that the boats (Volvo-70's) are 10 feet longer and much, much faster than their predecessors, the Volvo-60's (or Whitbread-60's). On the other hand, the maneuverability of the modern yachts in tight places, such as Chesapeake Bay, is challenging.

In 1998, in the seventh leg of the WRTWR, the Dutch yacht **BrunelSunergy** took the first place on the podium. The leg went from Fort Lauderdale to Baltimore, a coastal trip along the American eastern seaboard to the north. On board the contesting yachts, a crew of twelve men usually operate the boats. On this leg, I was recruited as a meteorologist on board the **BrunelSunergy**. Already, for several months, I was involved in this project, mainly from behind my desk in my office in De Bilt (Royal Netherlands Meteorological Institute, KNMI), but suddenly I was invited to come over and take part in one of the toughest ocean racing sports.

Frits Koek onboard the *BrunelSunergy*.

Preparations

To be prepared for the unexpected, Stuart Quarrie, the navigator on board the **BrunelSunergy**, and I first went for an explorative trip to the place of arrival, Chesapeake Bay. The bay runs more or less north-south and is approximately 200 km long. The surrounding land is rather flat, and there are many rivers that run into the bay. Our special attention was for current and sea breeze, and we interviewed several local sailors about these phenomena. We even went to the nearest office of the National Weather Service, where we consulted David Feit, now Chief of the Ocean Forecast Branch.

Chesapeake Bay is an area with a semi-diurnal tide, but, due to the outflow of the rivers at certain places the ebb-current is felt predominantly. During a preceding spell with a lot of precipitation in the river basin, a flood current is hardly noticed. About sea breeze, especially in the Annapolis area near Baltimore, we found a practical guide, "The Sailor's Wind," written by a local sailor. The writer divided the sea breeze into three categories: the local pure sea breeze, the Chesapeake's amalgamated sea breeze, and the ocean sea breeze.

An important point to keep in mind when we would arrive in the Bay was the funneling effect of the wind following the rivers on the wind direction in the Bay. Depending on the gradient wind, the wind runs into the mouths of the rivers, or it follows the river into the Bay.

'Back' in Fort Lauderdale, I started collecting forecasts for the sailing area from the European Weather Centre (ECMWF) four days before the start of the leg.

The general idea

Since no contact was allowed between the shore and the ship while they were in the race at sea, we set up a system where KNMI put several forecasts on the web. This was done until the actual start of each leg, so the skipper and/or the navigator of the **BrunelSunergy** had access to the most recent products tailored to their needs. Apart from these pre-start forecasts, consisting of ECMWF wind and pressure prognoses up to +144 hours, ensemble products and wave forecasts were supplied. Additionally, all yachts received general analyses and forecasts from the race committee during the race.

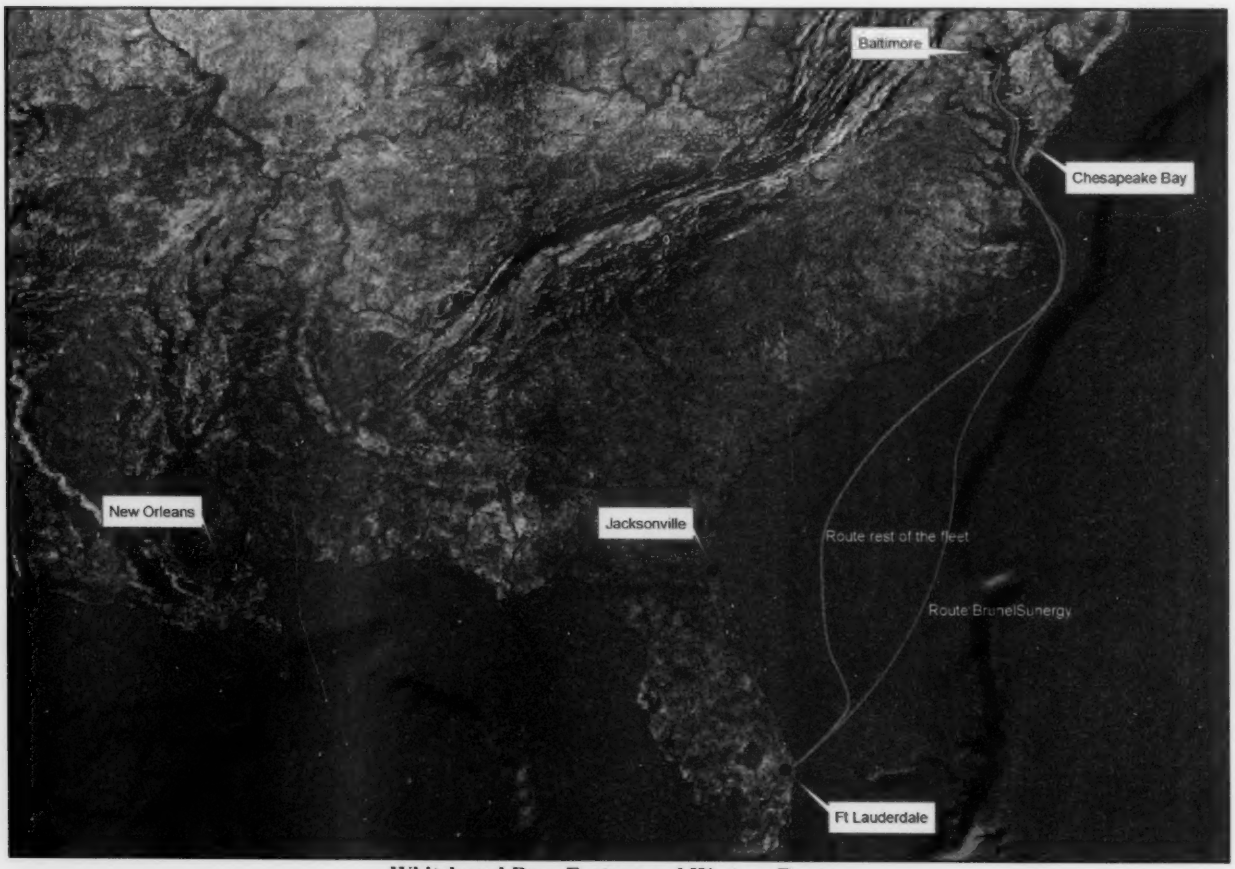
The weather situation before the start

Already days before the start, which was at noon on Sunday 19 April 1998 in Fort Lauderdale, the midwest and southern regions of the USA suffered from various tornados; the national television paid lots of attention to that. The general weather situation, a day before the start, was described by my colleague Kees Dekker as follows:

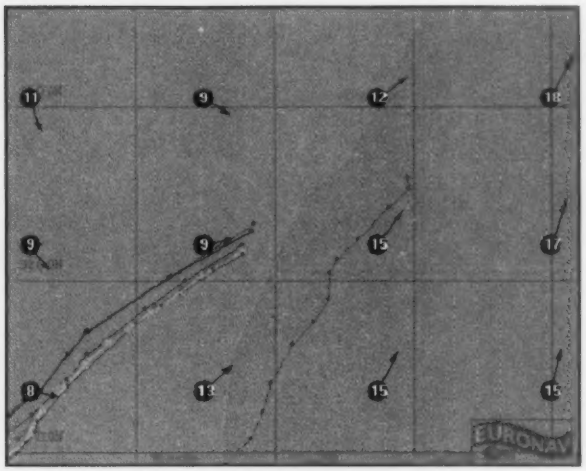
"The center of the Atlantic high near the Azores, with a ridge to the west over Florida, is slowly drifting to the west. Like the previous two days, a low is deepening over the southern states, moving northeast. At Sunday 12:00 UTC the position of the low is over Tennessee. This, together with the west drifting centre of the high, will cause an increasing wind over the east coast. At the start a south-easterly wind, around 15 knots can be expected, but soon the wind will increase to 20-25 knots. The low continues to move to the northeast, expected near Baltimore at Monday 12:00 UTC. The associated cold front will pass Monday between 00:00-06:00 UTC, but there will be a through behind. Winds ahead of the front are stronger than those behind it. There the wind decreases quickly and shifts to directions between north and northeast. The area of high pressure that is building up over the eastern USA will cause a period with light wind speeds over the Chesapeake Bay area. While the high pressure area is moving to the northeast, winds will become more southerly on Wednesday.."

The forecasted situation sketched a picture in which it seemed possible to take advantage of the strong south-easterly winds ahead of the cold front during the first 24 hours. Compared to the westerly route along the coast, which was longer but added 3–4 miles per hour due to the Gulf-stream, the calculated easterly route was faster.

On the morning before the start, the new forecast was not consistent with the previous forecasts. Kees described this as follows:



Whitebread Race Eastern and Western Routes



The *BrunelSynergy* takes an easterly route to use the advantage of the winds.

"After being consistent during the last three days, the model decided today, the most important day of the race, to change its ideas. The difference for day one is that the model computes a faster movement of the depression with a more northerly track. The low is now expected near Montreal on Monday around 00:00 UTC. The cold front, that moves faster to the east, is now expected along the Georgian coast on Monday 00:00 UTC and 6 hours later about 150 miles offshore. Meanwhile, an area of high pressure is building over central USA in the wake of the depression. The high pressure area is expected over Cape Hatteras on Tuesday (00:00 UTC). In the +72 hours forecast, a tiny low is developing on Tuesday (00:00 UTC), just north of the Bahamas. Perhaps a wave in the cold front?"

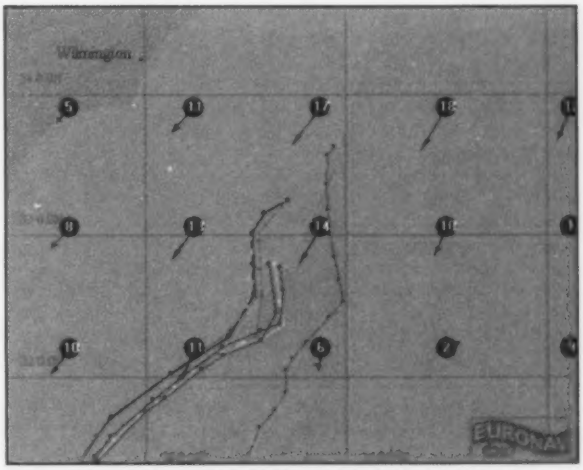
The eastward pace of the cold front was too fast for us to benefit from the favorable wind ahead of it. Our strategy came under pressure.

Kees doubted the value of this model run, especially considering the fast northeasterly movement of the depression. Supporting his mistrust, he sent me the +12 hours forecast together with the observations of that same time (Sunday 19 April 00:00 UTC). From this it was clearly visible that the high pressure near Washington was properly forecasted. The low pressure near New Orleans, however, was forecasted to be worse. The actual air pressure on the northeast side of the depression was clearly higher than the forecast led me to believe. This could mean that the pace of the depression was not to be as high as was forecasted, but that it corresponded more with the previous runs. Accordingly, the same applied to the eastward movement of the cold front. Consequently we decided to hold on to our strategy as before.

The pre-start forecast and the possibilities

Bearing in mind Kees' considerations, the forecast did not diverge much from the previous runs. That was most convenient, because we planned our strategy already the evening before the start. Of course, we would have changed our plans, if there had been a significant and reliable change in the forecast, even a few hours before the start.

During the start, a south-southwesterly wind around 15–20 knots was expected. After the start we had to choose to either follow the Gulf-stream or to take the shortest route towards Cape Hatteras. The first option would increase the speed over ground with 2–3 knots, but we had to sail more miles. On the other hand, although shorter, the direct route had some parts in which the Gulf-stream could work against us. Another option was the favorite: the cold front, approaching from the west, provided a stronger wind on the east side than on the west side. The wind direction ahead of the front was better than behind it; winds ahead were southerly and winds behind the front were westerly to northwesterly. Somewhere we had to cross the front, and the choice of that moment was very important. It was expected that we would cross the front sometime on Monday in the afternoon. Provided that the wind did not shift to the north too quickly, it might be possible to sail to Cape Hatteras on one tack. After passing

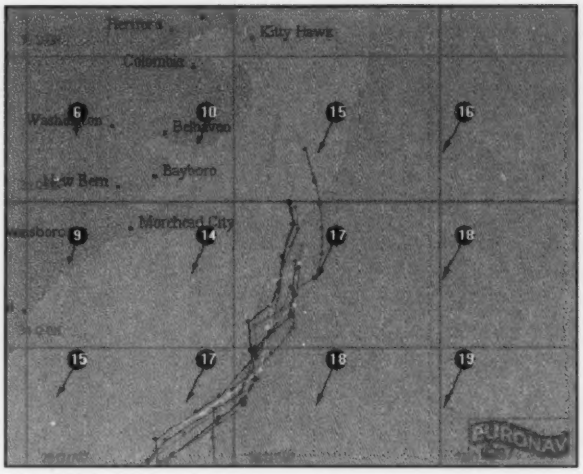


The *BrunelSynergy* begins crossing the front ahead of the other ships.

Cape Hatteras, the wind was expected to veer to the east and gradually decrease in speed to around 10–15 knots. In Chesapeake Bay, where we would probably arrive on Tuesday evening, the wind would be southerly, later southwest with 10 knots.

Decisions while underway

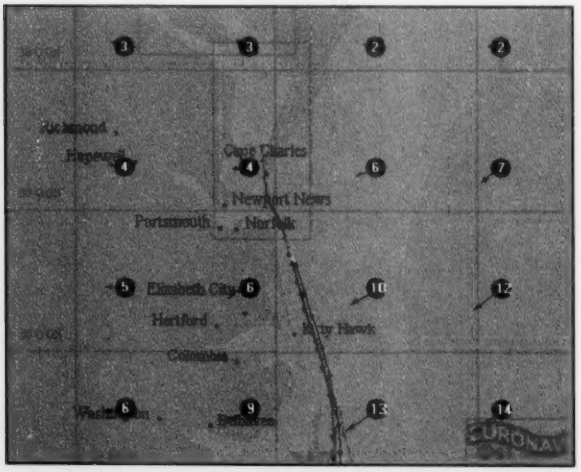
When, on the first evening after the start, all other competitors decided to go for the Gulf-stream option, I was more or less shocked. Did I miss something that the others had noticed? Over and over I re-calculated what we had to do, and every time I came out with the same solution: we were on the best track. After an intense talk with the skipper, we decided to continue this line. Further along the route, the toughest decision was to determine at what time we would cross the front and move back towards the coast. Ahead of the front we found the forecasted wind. The ship raced through the water. At a certain point the amount of cloudiness near the horizon increased. First, high cirrus, later, the base of the clouds dropped. After the start, no information had been received that this was indeed the expected front. When the line of clouds passed the ship, the wind rotated 360°, it rained, and the wind was very gusty. After this passage, the wind hadn't shifted to the north at all, and I found it extremely difficult to assess our situation without having any observational information from our region. On the western horizon, again clouds appeared and the high cirrus was still there. Most likely we passed a squall line and had the cold front still to come.



The *BrunelSynergy* tacks towards the Chesapeake Bay.

And, indeed, the front went by with gusty winds, squalls, thunder and lightning. The wind veered to the northwest and decreased rapidly in speed, which was not ideal. Luckily, as we moved away from the front, the wind veered more, which gave us a better angle, but, unfortunately, this was not enough to reach Cape Hatteras in one go. We had to tack several times, which cost us several valuable miles of our lead. The now northerly to northeasterly wind increased and came from the opposite direction as the Gulf-stream. That caused a nasty situation. The waves, already around 2–3 meters high, became steeper and pounded the ship in a very unpleasant way. In retrospect, the colleagues on board experienced this part as the worst part of the whole race around the world. It was only after the passage of Cape Hatteras that life became more bearable on board.

Chesapeake Bay was characterized by light wind and not much current. We entered the bay during slack water, which turned with us into the bay. The yachts behind us had a more favorable flood current of about 1–2 knots. Also, the wind filled the bay again from the south, giving the other boats a better speed. Despite all this, we kept our lead, and, with 15 minutes difference, the **BrunelSunergy** finished first in this leg. For the first time ever since Connie van Rietschoten (1982), a Dutch yacht triumphed in a leg in the Whitbread Race.



The *BrunelSynergy* enters the Chesapeake Bay ahead of the other competitors.

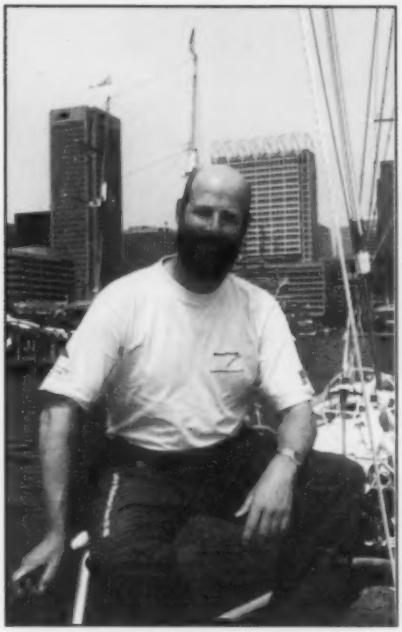
Remarks

Reviewing this leg, one can question why more ships did not follow the same route as the **BrunelSunergy** did. There are, however, several reasons:

Using the last ECMWF-run, it was not logical, and the westerly route seemed more profitable;

The 'easterly' route did not benefit much from the Gulf-stream;

In the overall standings the **BrunelSunergy** did not have much to loose. The other boats were more worried about each other with respect to the ranking and thought: "as long as we can see our rival, they cannot carry out any unexpected moves".



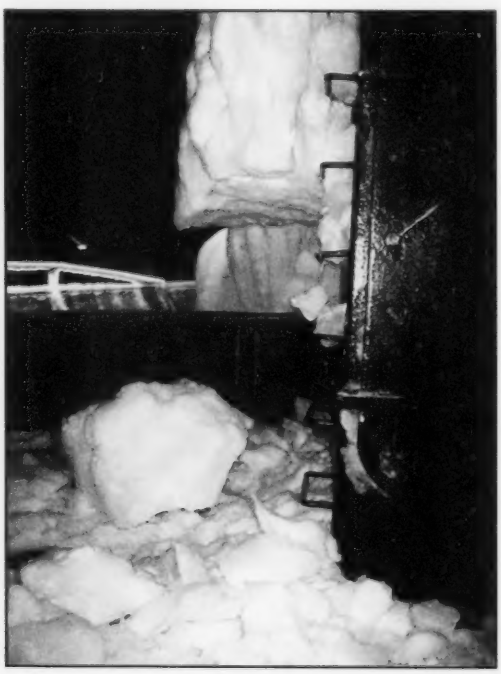
Frits Koek onboard *BrunelSynergy* in Baltimore Harbor.

Severe Icing Aboard the Fishing Vessel Alaskan Leader in January 2006

Deb Russell, Officer-in-Charge, Port Meteorological Office, Valdez Alaska
Photos courtesy of Dennis Black

A fairly strong area of high pressure moving off Siberia into the Bering Sea dropped temperatures into the low teens during mid January. Low Pressure held to the south along the Aleutian Islands and helped to tighten the pressure gradient, which resulted in Northeastly winds howling to the tune of 35 kts or greater. Sea reports ran anywhere from 10 to 20 ft during the period. The combination of cold air, strong winds, and high seas created dangerous freezing spray conditions for vessels operating in the area. According to Dennis Black, the Captain of the **Alaskan Leader**, the icing conditions were some of the worst he had ever experienced.

Valdez was able to obtain reports on the weather and icing conditions via a relatively new satellite telephone system. The satellite phone is used primarily for the collection of ship observations from vessels operating in Alaskan Waters. The phone reaches from the Gulf of Alaska to the Arctic Ocean with equal clarity and is credited with a significant increase in real time data via the VOS program.



***Alaska Leader* ice accretion due to freezing spray.**

Shipwreck: *E.M Ford.*

by Skip Gillham, Vineland, Ontario, Canada

After fifty-seven years as an iron ore carrier on the Great Lakes, the Cleveland-Cliffs freighter **Presque Isle** was due for retirement in 1955. It gained a reprieve, however, and was rebuilt as a specialized self-unloading, bulk cement carrier. It survives today in its third century of service, despite two serous accidents, and has reached the age of 108.

This vessel was built by the Cleveland Shipbuilding Co., and launched at Cleveland, Ohio, on May 25, 1898. The 428-ft long by 50-ft wide vessel was registered at 4,578 gross tons and joined Cleveland-Cliffs under their Presque Isle Transportation Company. It was the company flagship for several years until newer and larger bulk carriers assumed that honor.

Presque Isle usually loaded at the various iron ore docks around Lake Superior and delivered millions of tons of cargo to the lower Great Lakes ports. It operated through two World Wars, the Great Depression and the Korean conflict. The pace of service was accelerated by the battles and limited by the economic struggles of the nation.

On occasion **Presque Isle** returned up the lakes with coal and, on May 3, 1939, was the first ship of the new season at the Georgian Bay port of Midland, Ontario, arriving with a load of corn from Chicago.

Cleveland-Cliffs had no further need for a ship of this size by the mid-1950's so it was idle when sold to the Huron Portland Cement Company in 1955. They had the hull rebuilt to become a self-unloading cement carrier. Despite all the changes, it continued to be powered by the original 1,605 horsepower quadruple expansion engines, one of the last such power plants to serve on the Great Lakes. Later, in 1957–58, a new and larger pilothouse was installed in place of the original structure.

Renamed **E.M. Ford**, the ship returned to work on April 19, 1956, only to lose steering on the trial run and collide with the self-unloader **A.M. Byers** in the St. Clair River near Algonac, Michigan. Both ships received significant damage and the **A.M. Byers** sank in shallow water.

E.M. Ford was repaired and began hauling bulk cement from the Huron dock at Alpena, Michigan, to company storage silos around the Great Lakes. Between 1958 and 1977, the ship carried 898 cargoes and all were powdered cement. Most came aboard at Alpena and these were mainly taken to Green Bay, Saginaw, Milwaukee, Waukegan, Muskegon, St. Joseph, Detroit, Buffalo, Toledo and Cleveland. On twenty-three occasions **E.M. Ford** passed through the Welland Canal for the Lake Ontario port of Oswego, New York. The ship is shown in Lock Three on June 23, 1979.

Generally the Huron Cement boats were among the first to enter service each year and the last to tie up. Work was continuing late into 1979 when the vessel tied up at Milwaukee with 7,000 tons of cement.

It was Christmas so most of the crew were given leave to celebrate with their families. A winter storm lashed the area while most of the men were gone and the surging waves repeatedly bashed the **E.M. Ford** against the dock. The constant pounding opened a gash in the hull on December 25 and the crew on board could only watch their vessel settle at the dock. The water mixed with the cement to create a major problem.

Amazingly the **E.M. Ford** was repaired. It was salvaged, towed to Sturgeon Bay, Wisconsin, on March 3, 1980 and returned to service in the summer. It was idle in 1984 and 1985 but was given a refit in June 1986 and resumed work.

Huron Cement was purchased by Lafarge in 1987 and the ship now operated under the banner of Huron Transportation. It was inspected again in 1991 and certified for a return to service but was laid up at Superior, Wisconsin, in 1992. **E.M. Ford** was towed to Saginaw, Michigan, in 1996 for use as a storage hull.

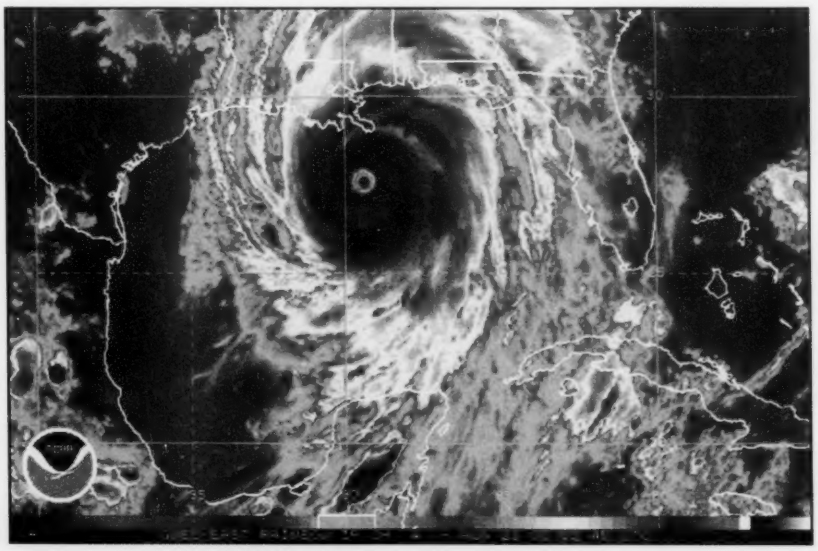
Many hoped that the vessel would be reactivated for it centennial season in 1998 but the ship remained idle. It continues to serve as a storage barge but is well maintained. **E.M. Ford** has beaten the odds before but at 108 years old, chances of trading again under steam seem to have evaporated.

From The PMO Desk: Hurricane Katrina Aftermath

Paula Campbell, Port Meteorological Officer, National Weather Service, New Orleans, LA
Photos Courtesy of Michael Rieger, FEMA

I have been asked to share some of my life experiences as Port Meteorological Officer (PMO) in New Orleans during the events of Hurricanes Katrina and Rita. Thanksgiving has just passed I have a lot to be thankful for. I am alive, I have a job, I have found a new place to live here in Jefferson Parish (that in itself is a miracle), and all of my friends and co-workers are accounted for. I think that not only for me, but also for all of Louisiana, Mississippi and Texas, that new meaning will be held for this holiday season of thanks and goodwill. It will be hard to keep this "PMO account of events" in a "PMO" perspective, because when something of this magnitude happens, survival instinct pulls you through, which has nothing to do with business. Just staying alive, making wise decisions, and making sure the ones close to you are taken care.

Leading to the week of Katrina, I drove to Pascagoula and Gulf Port, Mississippi to brief ships on Katrina, as well as calibrate their barometers. I wanted them to send us good observations while they were heading out and away from the Hurricane. On return to my office, which is located at the New Orleans Louis Armstrong International Airport, Katrina looked like she would move a bit to the east and send her worst to the Florida panhandle. I was very sick with a fever (strep throat) and Friday I called in sick, took my medicine and slept all day and night. Saturday morning I was awakened by a phone call from my sister who was very concerned with the new projected path of Katrina. The last projected track I saw, Katrina was going towards the Florida panhandle. Having confirmed the new path on the National Hurricane Center website and uttering a few choice words (all of you salty sailors out there would be very proud), I made Houston, Texas my destination. My immediate thought was that all of my ships would be deviated from New Orleans, with most going into Houston. The workload of the PMO in Houston would climb with the increase of incoming vessels. Once there and established, I could continue to provide full support to the Volunteer Observing System (VOS) program. I immediately called and made reservations for a Houston hotel that was pet friendly. I reserved it for five days, starting on Sunday. I proceeded to email my ships, which were in the vicinity of concern, giving them an update with attachments of the latest track and guidance of Katrina. My home computer was the last thing I dismantled, so that I could send out the most recent updates to my ships up to one half hour before leaving my apartment on Sunday Morning. After sending my last Katrina update and signing off, it really hit me how seriously scary this situation was becoming. With some humor and sadness, I printed the track and tacked it up on my bedroom wall. My next-door neighbor wouldn't leave without me, so on Sunday morning, with my car stuffed with my computer, personal effects I hold dear to my heart, some clothes and my two cats, we caravanned to Texas. It took us 14 hours to get to Houston.



GOES Satelite Image Hurricane Katrina.

Houston

Upon arrival in Houston, I unpacked, fed the cats, and turned on the TV. My God, already in New Orleans and on the Mississippi Gulf Coast all hell was beginning to break loose. Telephone lines and communications were already starting to break down in Louisiana. The 504 and 985 exchange was becoming hopelessly overloaded, and calls were not getting through. It was only for the fact that I had a cell phone from my previous residence in South Carolina that I was able to get through to anyone at all. The lesson learned here is to have redundant but separate forms of communications to ensure uninterrupted communications. With my phone, I was able to call my emergency contact number and report my whereabouts. I was quickly accounted for, which was a problem for many agencies.

The TV was watched constantly for any news or updates on all things Katrina. The amount of people crammed into this hotel was unbelievable. The staff of this hotel should be commended for doing as well as they did under the circumstances. The first day people were actually optimistic and almost giddy. After the second day, the writing was on the wall…people were running out of money, and New Orleans and much of the western Gulf Coast were in ruins. There was nowhere for people to return to, and the hysteria was already glaring. Reality set in, and it was horrible to watch. People were taking the food from the continental breakfast and piling it into their bags, knowing they were going to have to leave and food would be scarce. Many people were running out of money, since most were only prepared to stay for two to three days. Tempers were starting to run thin, and the mood was changing fast and for the worse. It was becoming desperate. I was very ready to leave by Friday morning sick or not. I called my friend Mike Kennedy, the Electronics Supervisor at the Houston Forecast Office. Mike and his wife Bernice were ready to take me in for as long as needed. I also kept in close contact with Chris Fakes, the Houston PMO. He was ready and waiting to take me in and get me started working out of the Houston office.

On Monday, feeling much better from borderline pneumonia, I was able to sit in on the NWS Southern Region conference call concerning the impact of Katrina. My parent office in Slidell was devastated and a friend/co-worker, Jake, was missing. It was like listening to an old radio show. It seemed so surreal. Things and places were just gone. There were no voice communications with the Slidell weather office, and information was sent via text messages to various people who conveyed things the best they could. It would be days before a vital communication link would be formed between the Slidell office and the outside world. There was no word yet on the National Data Buoy Center located at the Stennis Space Center in Southwestern Mississippi. Chris and I were standing by to see if there was any information on the VOS management team in Mississippi. No news.

I was now temporarily assigned (TDY) to the Houston weather office and needed to get my things in order. For me to be 100% useful in Houston, it would be necessary to take a trip back to New Orleans and gather my PMO equipment as well as my Government Vehicle. This way Chris and I could split the large area he covers. Jefferson Parish in Louisiana was going to allow a small window of opportunity for residents to return and gather belongings. This was a good time to go. Mike Kennedy got his truck ready, so he could assist me in getting anything I could salvage from my apartment and to recover my PMO tools and vehicle located at the New Orleans airport. We departed Monday evening, drove to Baton Rouge, slept in the truck until 5A.M., and then set out for Kenner. We timed it so that we would get to the I-10/Hwy 61 intersection right at the 6 A.M. curfew lift time. There was no gasoline available anywhere. Strict curfews were in place, and looting was ram-

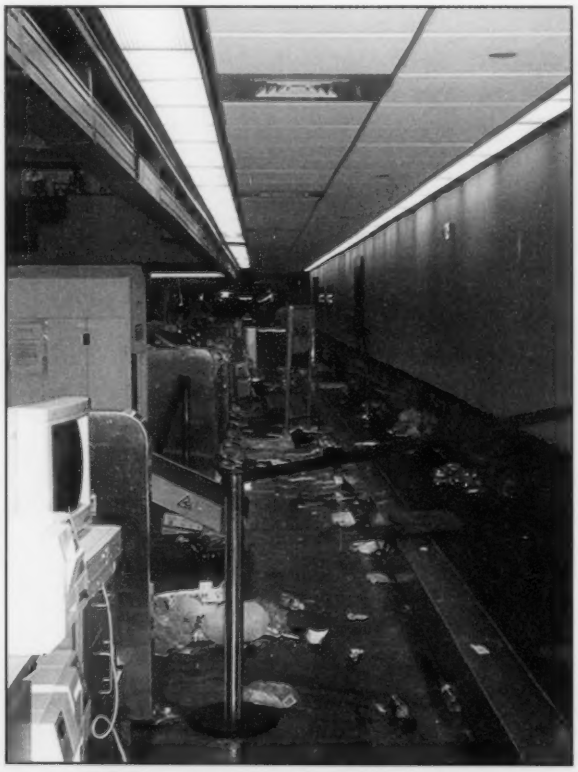
Helicopters on tarmac at New Orleans Airport

pant. Women were advised not to go anywhere alone under any circumstances. New Orleans was now a dangerous and volatile area. I-10 was blocked from the Hwy 61 exit into New Orleans. Only emergency vehicles could use I-10 from that point on. Convoys and emergency vehicles were streaming through with lights and sirens. Once on Hwy 61, it was slow going. After we arrived in the vicinity of Convent, Louisiana we started to see some damage, and, by the time we got to the airport, things got bad fast. The closer we got to my apartment, the more it looked like a bomb went off. Once inside, I got what I could, which wasn't much, since mold was already taking hold. My poor fish looked like a science experiment gone bad. However, I had a new sunroof in my bedroom where the roof used to be. In my kitchen, sludge was dripping from the cabinets. Another life lesson came with my refrigerator—that smell will stay with me forever (and don't trust those new stretch heavy-duty garbage bags, they do break).

Mike and I drove to the airport where my PMO office is located and my Government Van was parked. There were no traffic lights, and there were lines, trees, telephone poles, debris, etc., covering the roadways and the parking lot; creative driving was a must. Most of the vehicles left behind had major damage due to projectiles. My van was the only vehicle that still had the glass somewhat within the window frame; it was shattered but still in place. Mike checked to make sure that water had not gotten into the vital engine parts and topped off the gas tank with the gas we carried from Texas. Clear packing tape and lots of duct tape were the tools of choice for covering the entire passenger side windows in order to safely drive the van back to Houston.

The next task was getting to my office, which is actually located underneath concourse C, the American Airlines terminal. By now the airport had become the main Army Combat Support Hospital. This is also where they housed some of the National Guard, Army, Air Force, Navy, Marines, Federal Marshals, and reservists. All the normal entryways were closed, barricaded, or manned by guards holding rifles. I was shown the "new" main entryway and was approached by the duty officer. After showing my Government and Airport I.D.'s, I was waved through. The tarmac was cluttered with National Guard Black Hawk Helicopters, ambulances and more helicopters. Between the helicopters and ambulances, the tarmac was filled with military vehicles carrying soldiers and baggage carts ferrying people's personal effects, food, and garbage. It was busy, smelly, chaotic and very intimidating. I pulled up to my office, and on the stairwell were soldiers in full combat gear holding rifles. Flashing my badge, they allowed me to proceed to the door. I had to walk through the room that was normally the FAA contract weather observer's space to get to my office. The only light in the observer's office was the sunlight streaming in from the open door. I woke up the Marshals who were camped out and sleeping in the office after working a midnight shift. I apologized and went on into my office. I gathered many of my things that I thought I would need in Houston and threw them into my van. I then showed the Marshals where I kept my coffee pot and coffee, so that they could make a pot if they wanted to. I wished the guys well and made my way back to Mike. We then began the long caravan back to Houston. We made no stops, just drove straight back.

My government van needed to have all the glass replaced on the passenger side, so that was on the top of the "to do" list so that I could become operational. While waiting for my laptop to



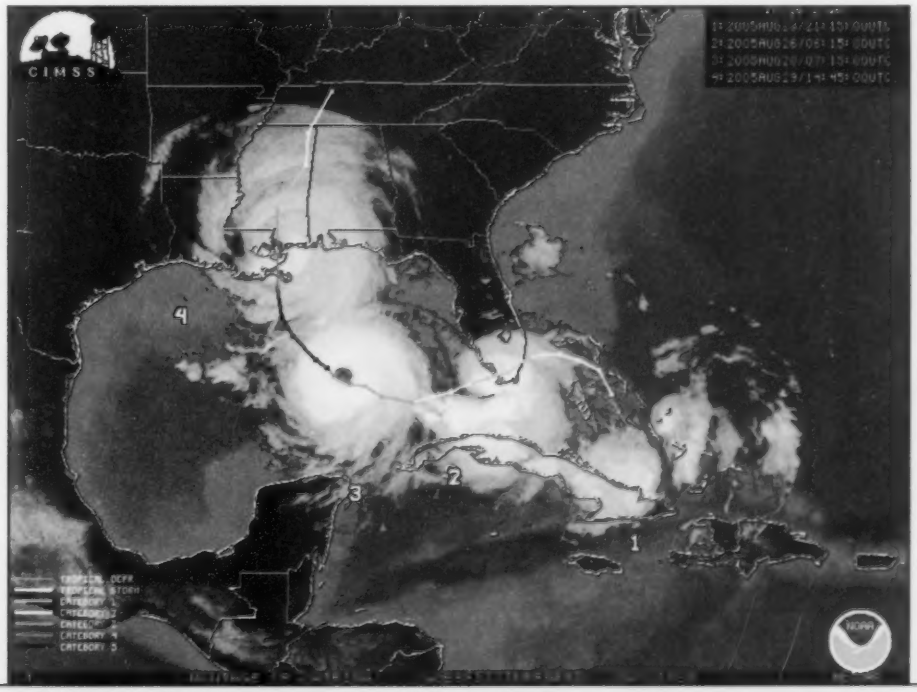
Debris in terminal at New Orleans Airport

become operational, Chris Fakes (PMO Houston) gave me an orientation on the Texas Port situation and showed me around my new temporary work area. Because of the devastation in the Slidell forecast office, getting my laptop operational took much longer than expected. Consequently, I was not able to communicate with my ships for a lot longer than I had hoped. As before, we discovered that vital communications are one of the first things interrupted during an event like this. In addition to trying to become operational, I was trying to recover my personal effects, deal with the loss of my home, and my life as I knew it. I had to register with FEMA as well as register with the Red Cross, which is no small accomplishment. The Red Cross would help me obtain prescriptions for the medications that I lost in the storm. In the past week I had been in moldy, filthy areas, splattered with putrid food, and scooped up swollen decomposed fish. Also, with a tell tale smell I will never forget, it was obvious that there was raw sewage close by. Because I was exposed to these things, and would continue to be exposed, I needed to protect myself from disease. First things first, I went back to the shelter and got a tetanus shot as recommended.

On Monday, the 12th of September, my laptop was fully operational, and on the 14th, my government van was repaired. On Wednesday afternoon, the 14th, Mr. Trotter, my immediate supervisor from the Slidell office, informed me that he needed me back in New Orleans by Monday noon. I had to cancel ship visits and dismantle my laptop. The Slidell weather office wanted to include me as part of their team. They were able to secure a trailer for me to live in if I was unable to find housing elsewhere and Mr. Trotter made sure my needs were met.

Mr. Trotter then assigned me with the new task of inspecting the damaged ports by collecting pictures and data for post Katrina economic impact studies. Mr. Trotter knew I would be able to have access to many areas most people could not get into. With my established working relationships with many of the leaders in the commercial and shipping industries, I would be able to obtain fast and accurate information and data for the reports. This was part of a huge collaborative effort. Like everyone else in the area, I felt overwhelmed with so much on my plate, along with taking care of my personal issues.

Getting around New Orleans was a major concern. I had to call the Port of New Orleans to find out the ship situation, and obtain authorization to drive beyond curfew times, and obtain permission to enter secured portions of the city. In addition, there was only one way into the Port since all other



entries were now closed. I also had to obtain special permission to drive on the Causeway, which was restricted to emergency and official vehicles. The I-10 bridges into Slidell were destroyed, and Hwy 11 was a nightmare. There were curfews everywhere, nothing was open; absolutely no services were available. Most places didn't even have running water or electricity. There were entire areas throughout lower Louisiana that were just not accessible.

I called the Port of New Orleans and the one person who I knew who could help me my friend Mr. Gary LaGrange, President/CEO for the Port of New Orleans. I met Mr. LaGrange over a year ago at the Port's Headquarters and he told me if there is anything I ever needed, I was to call him. Well, I took him up on his offer. His office came through and was very helpful. They took my information and faxed me the necessary papers that I needed to carry for full access anywhere I needed to go. They also provided directions on the one and only route to the ports. With Mr. LaGrange's help, I was able to drive most anywhere I needed to go.

New Orleans

Home at last. I am one of the lucky ones. We had electricity and running water at my new house. They said that the water was safe and that you could drink it, but I still don't drink water from the tap. From now on it will be bottled water. Even though there was electricity, there was no gas. I took cold showers for almost one month. I was so excited when that gasman came to turn on the gas for my hot water heater and dryer. A hot shower, finally. Then slowly things got better. My telephone service was turned on in early November. Still, quite a few people had no service. My cable TV and Internet came back on around mid-November. The house was in need of a lot of cleaning, prepping, and painting. Although my new house suffered some damage, the little area of Harahan LA made out pretty good. Harahan is 12 feet above sea level, which is pretty high for Louisiana standards.

Rita

Hurricane Rita was coming now. I decided to stay and ride this one out at my office in the airport. After all, it held up for Katrina, and it was still packed with military. I also really felt pretty good about my new little house and its ability to withstand Rita's wrath.

My Office

Throughout the storm there was only emergency lighting in the FAA workspace and no lighting in my office or the bathroom, so I made sure I always had a flashlight in hand. I was so afraid of the large cockroaches that were taking over the airport. Garbage all over the tarmac and alongside of the dumpsters was piled high. Flies and other flying insects were abundant. The smell was horrible. The baggage carts were left full and scattered all over the airport grounds. Fortunately, some were filled with bottled water. Unfortunately, some were filled with garbage, including right next to my office door which were filled with personal effects and trash. I cannot help but wonder what happened to the people that this stuff belonged to. Prescription drugs, clothing, baby clothes, books, purses, dolls, eyeglasses, bibles, etc. This was so sad. Evacuated sick or dying people grabbed the most important items that they could carry in their hands, and it ended up here, in the garbage.

The lot where I usually park my van was taken over by the military. I was the only civilian who continued to park in this lot. In addition to my van, my car, and the military vehicles, the small lot was full of abandoned broken vehicles, many of the same cars that were there when I first recovered my van. I continued parking in the same area that I always had access to. The military left and was soon replaced with the drive through Red Cross and fully armed U.S. Marines.

Back to the Grind

Although the Port of New Orleans was open, ship traffic was light. My usual routes that I would take to visit Mississippi ports were essentially gone. The port of Gulf Port, home to the Chiquita and Dole wharf facilities, was destroyed. Route 90 was covered in debris, sand, and what was left of various casinos. All the homes along the Gulf coast were gone. The restaurants that I would stop to eat at on the way home from Mobile were gone. There were no services available to anyone. There were no gas stations, restrooms, restaurants or even rest areas. I was able to collect some good photographs for the Slidell Forecast office to use for their presentation to General Johnson (Director of NOAA's National Weather Service) and Bill Proenza (Southern Region Director). I visited my NOAA ships in Pascagoula, MS where I got to see what the storm surge did to my poor old **Oregon II**. That ship was lucky. Almost all the lines holding the ship gave way or slipped the bollards during the storm and only one line was left holding it to dock. A hole in the

bow occurred when it took out a chunk of the cement dock. One picture that I took showed a water line mark in the dock's warehouse at 16 feet. The normal water line from the wharf is 10 feet below the pier, so Pascagoula took a 26 ft surge. My other NOAA Ship, **Gordon Gunter**, faired much better, and they gave me a copy of the barograph trace left from Katrina. The Marine Fisheries building and the entire Pascagoula area were pretty much destroyed. Both NOAA ships, **Oregon II** and **Gordon Gunter**, were now housing and feeding NOAA personnel, their families, as well as many others.

Driving through the city of New Orleans was spooky. Even at mid week and the middle of the day there were no people…anywhere. They were not letting people in for some time and the city was nothing but empty streets and empty buildings. To my delight, I got an email from a ship that wanted to become active in the VOS program, so I drove all the way down to Port Fourchon Louisiana, just to the west of Grand Isle. While there, I took a drive over into Grand Isle. Words cannot describe the widespread damage. I had to just pull the van over and cry. Just after that run, I had to go to Port Sulphur. This was one of the hardest hit areas and until then the only access was by helicopter. I kept driving south on Hwy 23, and it looked like I was driving into hell. It just got worse and worse. I put myself in these people's circumstances and I sure wouldn't want pictures of my living hell captured as a Kodak moment. I drove, and I cried, and I drove some more. I feel a mixed emotion about driving to these places. I am one of the few folks who got to behold the ultimate devastating power that a hurricane can impose on life and community. I had to see for myself these places that were destroyed. I lived, ate and worked in these places; I would drive through them to get to my ships. Slidell looked like nothing but piles of bricks and sticks. Even if you lived in these areas, you wouldn't recognize your own street. I drove through the 9th Ward District. I cannot describe how bad it is. Now instead of visiting ships loaded with goods for commerce, we have ships of mercy. The academy ships are speckled on our wharfs, housing and feeding workers and officials. The Navy ships and MSC ships are doing the same. I have been able to visit three of the Maritime Academy ships over the last couple of months and visit their crews, including **Empire State**, **Sirius** (the new Texas A&M Maritime ship), and **State of Maine**. I feel very privileged to have been able to give them support (as much or as little) in any way I could. Two of my ships that were in Port Sulphur were housing and feeding rescue and aid workers. Two of my cruise ships, **Sensation** and **Ecstasy**, are docked downtown housing and feeding. The cruise ship **Holiday**, who is normally out of Mobile AL, is now docked across from the NOAA ships in Pascagoula housing and feeding.


Maritime Training Ship State of Maine


Maritime Training Ship Sirius

In the past most of my ships were concentrated in the Port of New Orleans, downtown. Now they are hither and yond. I spend a lot of time covering the Mississippi River and all the nooks and crannies that ships are able to access. Things are slowly trying to get back to normal. Commerce is slowly picking up and I am slowly getting my schedule back in tune. Like everyone else here, we are trying to work and clean up all at the same time. It is hard and frustrating. Everything here closes before I can get there, so I adjust my workdays. Stores never have enough people to run the registers. People are not coming back. Many businesses are just not able to run at all. If the people come back to run the businesses, there are no places for them to live. It is difficult at best and it will take this area a long time to recover.

I feel that it is important to end this account with this note to all of the ships that participate in the VOS program. I, as well as other PMOs had ships out in the Gulf submitting observations prior to Katrina and Rita. YOUR observations are the observations that were used in the mix to determine the projected path of these tropical systems. Your observations give vital information for analysts to determine such things as whether these storms are deepening or weakening. Your input makes a HUGE DIFFERENCE; I hope you really understand the impact marine observations have on these types of situations. Your data will be crunched for years by climatologists and scientists doing studies on tropical activity. Your data was what the experts used for ground truth to see if the models were in fact "on the mark". I want to thank the ships that provide observations for us. I think this active season reinforces the need for a program such as VOS. I am certainly proud to be a part of this program and I am proud to support the dedicated marine weather observers. I want to thank all of you who extended your prayers and good thoughts to me during this extraordinary time.

Image courtesy of http://www.srh.noaa.gov/hgx/gifs/Katrina.jpg

From The PMO Desk: Hurricane Wilma

Peggy Alander, Port Meteorological Officer, National Weather Service, Port Everglades, FL

It was a dark and stormy night. Actually no it wasn't. It was yet another beautiful, balmy south Florida day when Tropical Depression 24 formed southwest of Jamaica on October 15. Within 48 hours, Wilma became the 21st named storm of the 2005 hurricane season. This tied the previous record set in 1933 for the most named storms in one season. Wilma was tracking to the west-northwest, and, at one point, within 24 hours had intensified from a 60 kts tropical storm to a Category 5 hurricane with winds of 150 kts. The central pressure had dropped to 882 millibars, and her eye was 2 miles wide. This was a storm to watch carefully.

I had many reasons to be concerned with Wilma. First, the Hurricane Center was projecting her path over the Yucatan and south Florida. Second, most of my VOS ship routes are in the Caribbean and Gulf of Mexico, but I knew that every mariner and their loved ones were keeping a watchful eye on the weather reports and forecasts. Third, my husband and I were scheduled to go on our very first cruise for our 24th anniversary to Cozumel, where we were to go deep sea fishing. I am giving away my age here, but we married young.

As Wilma continued on her west-northwest track, the eye went over Cozumel. We all know she devastated the Yucatan for two days before making her track for south Florida. I started emailing my VOS ships, and even some friends who thought they were not getting enough information about Wilma's track. It was physically impossible for me to climb the gangways after just having a fairly major operation, leaving me with limited mobility and no feeling in my left arm. Port Everglades had closed, so there was nothing more I could do except continue my emails, keep an eye on the weather reports, and pray and hope for the best.

We had just bought our house, and it had no hurricane shutters. Being prudent and cautious, my husband went to the local hardware store, bought plywood, and proceeded to board up the house. This was right when Wilma was moving offshore of the Yucatan. I recall one of my neighbors coming over and asking "What was he doing that for?" He then proceeded to tell me how wrong the track was and was busting on the NHC forecasters. He didn't know I work for the best weather service in the world. After I told him he got real quiet, and that night he began putting up his plywood.

On October 23, there was no doubt about it. South Florida was going to get hit. It was just a matter of how hard. I sent out emails until it was time to shut down and unplug my home computer. We lost power the morning of the 24th. Winds from the southeast were incessant. My newly planted palm trees were in tatters. I had been hoping that the rickety shed out back would get damaged so we could get it replaced. I learned to be careful what I hoped for as a huge slash pine snapped in half, bounced off the shed roof and got lodged between the shed and three other pines. It was totaled. Standing on the leeside of the house, we also watched the Sears metal shed disintegrate. This wasn't fun anymore. The barograph pressure trace kept falling, and I thought it was going off the chart.

The southeast winds subsided as the eye passed over my house. Of course we had to go outside. It wasn't a clear blue eye as there was some low stratocumulus clouds overhead, but it was eerie. Eventually, everyone in the neighborhood came outside. There was some damage—our shed being the worse so far, but everyone was all right.

The backside of the eyewall came with a vengeance. A gust came out of the northwest, and we all ran back to our homes. Within minutes our neighbor's screened porch literally blew off his house, onto his roof and then across the street. Ours peeled up like a Spam can. Time wise, I don't know how long we endured those winds. All I know is it was too long. When it was all said and done, sustained wind speeds had reached at least 74 kts near Miami, 61 in Fort Lauderdale, and 71 in West Palm Beach. Peak gusts were 91, 98, and 88, respectively. Eventually Wilma moved offshore and I didn't know or care to where.

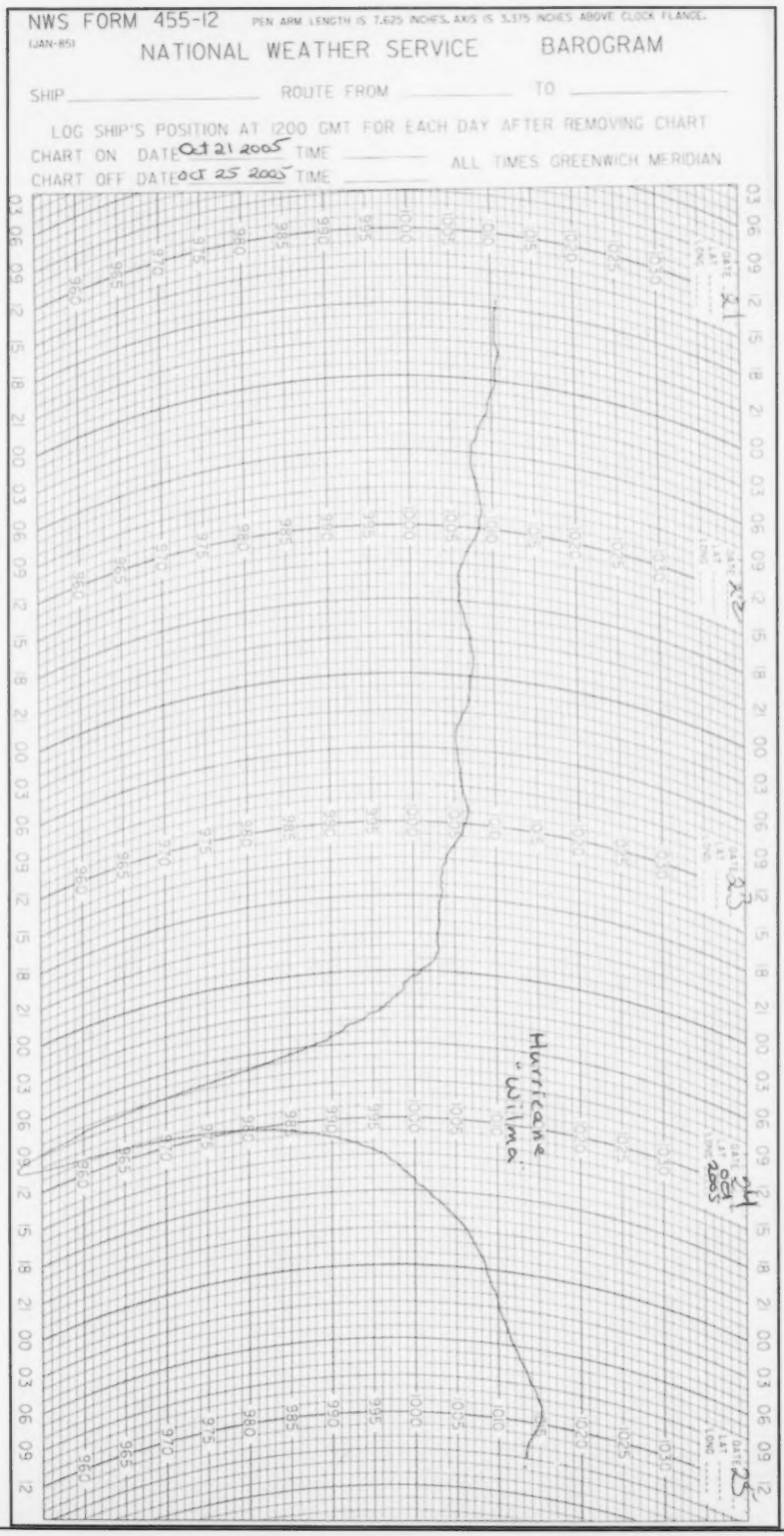
The next few days were crazy. South Florida was without power. Gas was pretty much not available. People were urged to stay off the streets, and curfews were put in effect. Port Everglades remained closed. At least Wilma had brought some good cold air in behind her, making clean up efforts bearable. My husband and I decided to go to central Florida, where my dad lives, to get a generator, gas, a hot meal, and a hot shower. When we finally found a place that had generators, my husband told me to stand by the floor model and not move because it was ours. I thought

he was crazy, but being a good wife, I stood there as he went off to procure it. When he came back and told me they were getting us two in boxes (one was for our good friends in Stuart), I moved away. That generator was instantly snatched up by a young man from Miami, who had been watching, just waiting for me to leave.

We left the next morning clean and full with our load of goodies, including the two generators, 50 gallons of gas, 100 pounds of charcoal, a gallon of lighter fluid, a Coleman campstove and lots of ice. We had the foresight to empty the minimal contents of the refrigerator, so at least we didn't have to deal with that when we got back. The lines for gas at the turnpike plazas were miles long. On the drive back, I got the call that Port Everglades was open for tenants to do damage assessments. The stark reality had set in that this was going to be a long haul. My office was fine, other than forgetting to unplug my computer which had died, there was no damage. However, the hallway and many of the other offices on the 3rd floor were flooded because the roof had not been fixed since Katrina blew the air conditioner off back in August. To this date it still floods out those same offices every time it rains.

Florida Power and Light was doing its best, and power was slowly coming back on throughout south Florida. It was time for me to see if we were still going cruising. When I called Carnival, I was told, yes, we were definitely going to Key West, but probably not to Cozumel. That would be fine, at least we could escape from reality for a little while.

We had heard that the Keys had flooded, but information was sparse. We had lived there for 12 years, with quite a few storms but never any



flooding. Ours was the first ship back to Key West since Wilma, but, while the downtown area had cleaned up, we were greeted with over four inches of rain. Add that to an already deluged area and water was bubbling up through the streets. We waded through and did our daughter's shopping list then went back on board. It was disheartening. Later reports showed Key West sustained winds of 62 kts with gusts to 72. Fort Jefferson gusted to 116 kts. Flood waters reached up to 6.5 ft in Key West. The Lower Keys had up to 8 ft. Marathon had 9.5 ft and the Upper Keys had up to 5 ft.

Our cruise continued to Playa de Carmen, and the destruction there left me speechless. Concrete power poles were snapped in half, and miles of trees were toppled. Again, we were the first ship in since Wilma, and the Mexican people were so happy to have some tourists. My husband and I proceeded with our plans to go fishing anyway and caught some decent Kingfish and Bonita. All too soon it was time to go back to reality and back to work. When we got home the power had come on—it was only out for ten days and for some reason our brand new well pump system had imploded. Something else to deal with.

Things were getting back to normal at Port Everglades and Miami. Container and tanker ships were coming in and offloading their valuable cargo. One thing out of the norm though was tanker trucks got police escorts to their destinations. My arm was strong enough to hold onto a ladder, so at last I could go talk with some ships to find out how they fared and where they had diverted to. Everyone had high praise for the Hurricane Centers accuracy with Wilma's track. I think that a lot of the credit goes to the ships that send in observations. They help out the forecasters so much. I have even had ships that do not participate in the VOS program FAX and email me observations when they are within 300 nmi of a system. Every mariner knows how important and vital a role the weather plays. Every observation is important, even if the weather is great!

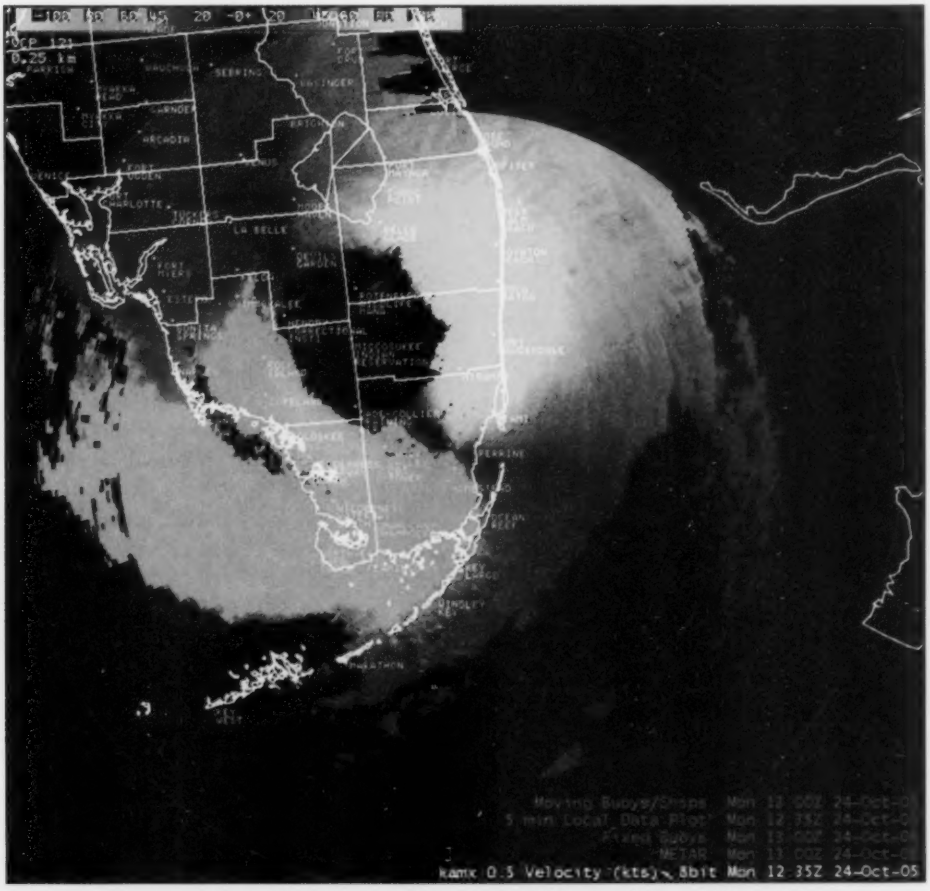


Image courtesy of http://www.srh.noaa.gov/mfl/events/wilma/Wilma_V.jpg

As I wrote earlier, when Wilma left Florida, at the time I did not know or care where she went. Over Christmas we went to the Bahamas. We pulled up to the port, and the first things we noticed were the fallen trees and the large amount of shingles waiting to be picked up. We knew where she went. The wrath of Wilma carried on.

It took Wilma four hours to traverse the south Florida peninsula. It will take months, maybe years for things to get right—if they ever do. But south Florida was given lots of notice and time to prepare. In part, because of the great weather observations that the ships relay, and for that we can't thank you enough.

Marine Weather Review—North Atlantic Area September through December 2005

By George P. Bancroft, NOAA National Center for Environmental Prediction

The period started out with a late summer pattern and a continuation of a very active hurricane season. September contributed three hurricanes, which moved into OPC's marine area of responsibility north of 31N and west of 35W. Late-season tropical activity, in what would turn out to be a record season, included two hurricanes in October, a tropical storm in November and a hurricane in December. The latter two were named using letters from the Greek alphabet, since for the first time there were so many tropical cyclones in 2005 that the National Hurricane Center ran out of names from the regular list for 2005.

Non-tropical storm activity picked up as the season progressed with most of the major systems tracking in a southwest to northeast direction. Ten hurricane-force storms developed during the period, with the active months being November and December with three each. The first hurricane-force low in early September, and possibly the one late in September, appeared to have tropical origins.

Tropical Activity

Hurricane Maria: Maria formed south of OPC's marine area on September 1 and moved northwest, entering OPC's waters about 400 nmi east of Bermuda as a hurricane on the evening of September 4, with maximum sustained winds of 75 kts with gusts to 90 kts. The cyclone attained Category 3 status on the Saffir-Simpson scale of intensity (***Reference 1***), a major hurricane, which recurved to the NNE twenty-four hours later. The maximum strength was 100 kts with gusts to 120 kts at this time when the cyclone was located near 33N 56.5W. Maria subsequently weakened while tracking northeast, becoming a strong tropical storm on the evening of the 6th. The ship **Marinus Green** (PECS) near 34N 49W, reported a southwest wind of 35 kts at 1200 UTC on the 7th while Maria passed about 120 nmi to the northwest. After re-intensifying to a hurricane on the evening of the 8th, Maria weakened to a tropical storm with maximum winds 55 kts and gusts to 65 kts early on September 9, near 40N 44W, and became extratropical early the next day. ***Figure 1*** shows Maria re-developing into a powerful extratropical storm in the thirty-six hour period ending at 1800 UTC September 11. The central pressure reached as low as 962 hPa at 0000 UTC on the 12th. In an area of sparse ship data, high-resolution QuikScat data (***Figure 2***) reveal several barbs in the 60 to 70 kts range on the south side of the storm center. A ship report came in later, at 0900 UTC September 12 from the **Godafoss** (V2XM), near 60N 32W on the north side of the storm, with northeast winds of 52 kts. The storm subsequently weakened to gale while passing east of Iceland on the 13th.

Hurricane Nate: Nate developed from a non-tropical low 300 nmi southwest of Bermuda late on September 5 and rapidly developed into a hurricane on the morning of the 7th, before crossing 31N and entering OPC's marine area near 63W at mid-day on the 8th as a hurricane with maximum sustained winds of 75 kts with gusts to 90 kts. The cyclone then began to weaken while tracking northeast, becoming a tropical storm near 34N 55W by mid-day on the 9th with maximum sustained winds 60 kts with gusts to 75 kts. Nate then weakened further and became an extratropical gale near 35N 44W on the afternoon of the 10th and merged with the front associated with the remains of Maria (***Figure 1***) before heading northeast and dissipating west of France late on September 12.

Hurricane Ophelia: Ophelia developed from a non-tropical low in the northern Bahamas early on September 6 and followed an erratic track off the north Florida coast, with some fluctuations in intensity between tropical storm and hurricane strength noted on the 8th and 9th, before crossing 31N near 77W as a minimal hurricane early on the 10th. Northeast winds increased in OPC's southern offshore waters in advance of Ophelia, with the **Madison Maersk** (OVJB2) near 31N 79W reporting northeast winds 39 kts at 1200 UTC on the 8th. The slow-moving Ophelia tracked northeast and brushed the North Carolina

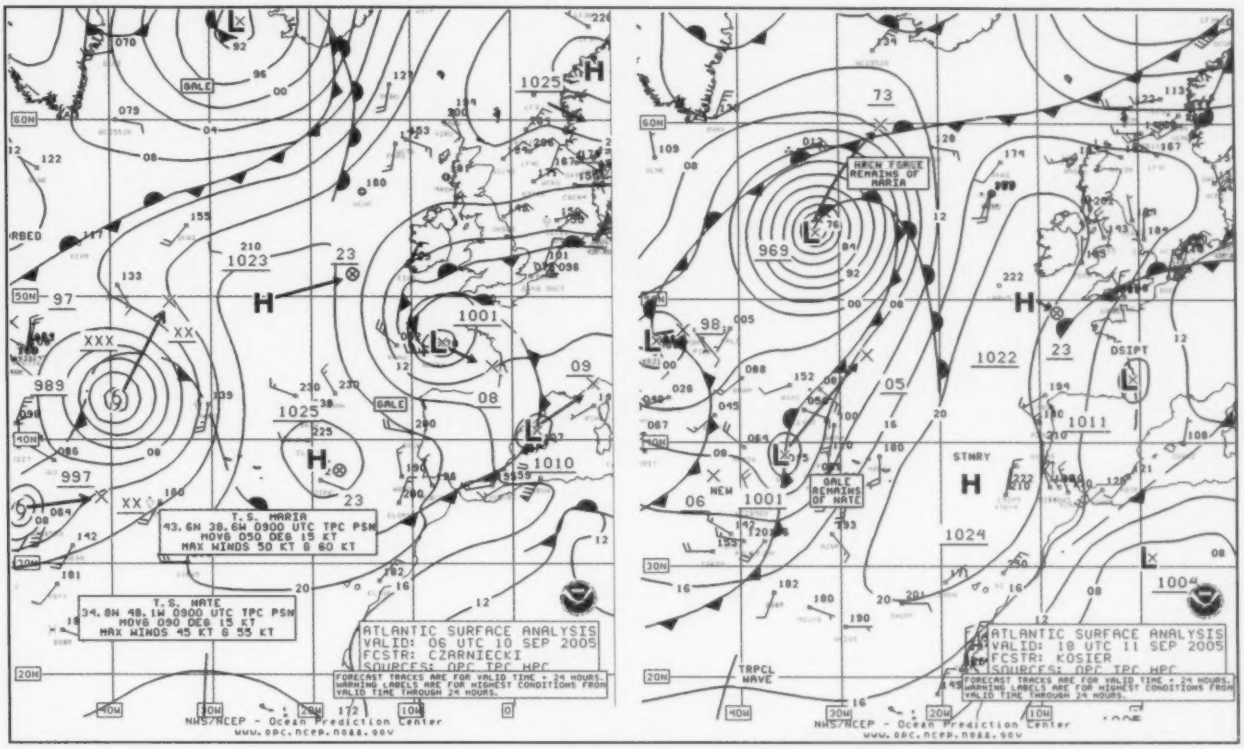


Figure 1. (above) OPC North Atlantic Surface Analysis charts (Part 1 - east) valid 0600 UTC September 10 and 1800 UTC September 11, 2005, showing Tropical Storm Maria becoming an extratropical hurricane-force storm.

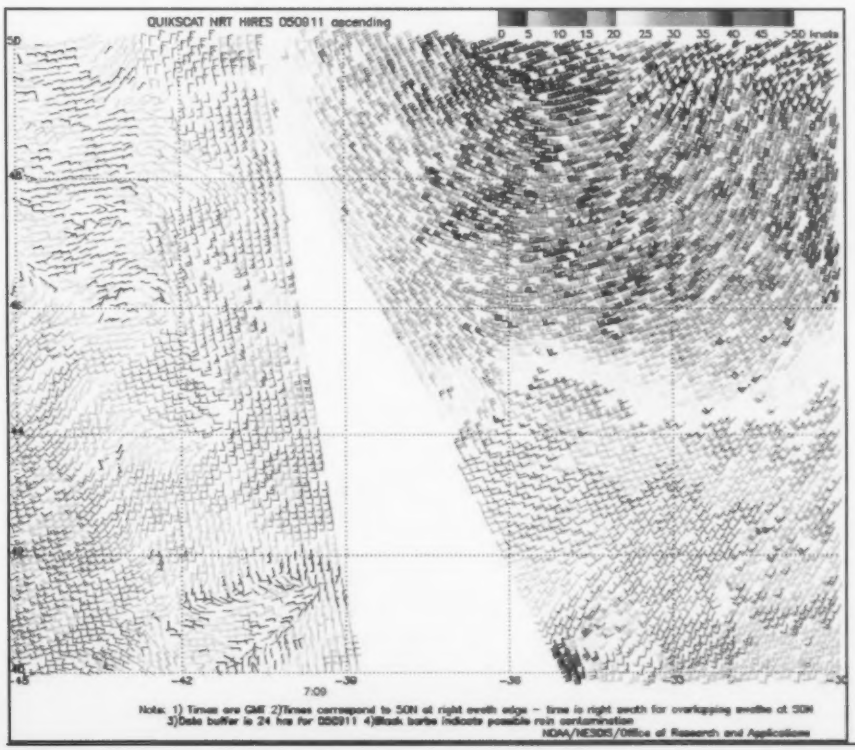


Figure 2. (left) High-resolution QuikScat scatterometer image of satellite-sensed winds on the south side of the storm shown in *Figure 1*, valid at about 0709 UTC September 11, 2005. The resolution of the image is 12.5 km, versus 25 km for the coarser-resolution version of the imagery. The valid time of the pass is about eleven hours prior to the valid time of the second part of Figure 1.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND	SEAS(m/ft)
Singapore Bay (MRGU3)	34N 75W	10/1800	E 40	
CSX Liberator (KHRP)	31.5N 78W	13/0600	S 50	
Maersk New Orleans (ELZY3)	32.5N 76.5W	14/0600	SE 60	
	32N 77W	14/1500	SW 55	12.0/40
Montebello (DGZN)	31.5N 78W	14/0600	SW 50	9.5/31
MOL Americas (V2EX)	35N 75W	14/2100	SE 65	
Buoy 41002	32.3N 75.4W	11/1900	E 47 G68	6.0/20
		10/2300		maximum 7.0/23
Buoy 41004	32.5N 79.1W	13/2000	NW 45 G56	5.5/18
		14/0100	Peak gust 60	
Buoy 41013	33.4N 77.7W	14/1800	W 54 G64	
			Peak gust 68	
				6.5/21
Buoy 41035	34.5N 77.3W	14/2000	NE 47 G56	
Peak gust 62		14/0700		
		14/2100		5.5/18
Cape Lookout (CLKN7)	34.6N 76.4W	14/2200	SE 54 G66	
		14/2300	Peak gust 75	
Buoy 41025	35.0N 75.4W	15/1600	SE 51 G 64	6.5/21
			Peak gust 70	
		15/1900		maximum 7.0/23
Buoy 44004	38.5N 70.5W	17/0800	SW 37 G47	7.0/23
			Peak gust 52	
Buoy 44008	40.5N 69.4W	17/1200	NE 29 G39	4.0/13
			Peak gust 45	
		17/1500		maximum 4.5/15

Table 1. Ship, buoy and coastal C/MAN station observations taken during Ophelia. Winds, gusts and peak gusts are given in knots.

Outer Banks late on the 14th and on the 15th before moving away from the coast. The cyclone reached maximum intensity early on the 11th (near 32N 76W) and again late on the 14th near the Outer Banks, after briefly weakening to a tropical storm on the 12th. At maximum intensity, Ophelia packed maximum sustained winds of 75 kts with gusts to 90 kts as a Category 1 hurricane. The maximum wind and sea conditions occurred with the passage of Ophelia as shown in the ship, buoy, and automated coastal (C/MAN) reports listed in ***Table 1***. The cyclone then accelerated northeast on the 16th and 17th as a slowly-weakening tropical storm, becoming an extratropical gale-force low on the south coast of Nova Scotia early on the 18th. The remains of Ophelia then headed across the North Atlantic before dissipating over the North Sea on September 23.

Hurricane Vince: A non-tropical low which had been nearly stationary in the far eastern Atlantic between the Canary Islands and the Azores developed tropical characteristics at midday on October 9 and was named as a tropical storm with maximum sustained winds of 45 kts with gusts to 55 kts. Vince then developed an eye and became a hurricane late that day with maximum sustained winds of 65 kts with gusts to 80 kts, despite sea surface temperatures reported by a nearby drifting buoy (13604, 34.6N 18.4W) of only 23 degrees Celsius. Vince accelerated northeast as a frontal system approached from the northwest and weakened to a tropical storm early on October 10. After further weakening, Vince passed just south of Portugal before making landfall as a tropical depression in southern Spain early on October 11, becoming the first tropical cyclone to make landfall on the Iberian Peninsula (***Reference 2***).

Hurricane Wilma: Wilma, after moving off the Florida coast early on October 24, entered OPC's southwest waters as a major hurricane on the evening of the 24th, near 32N 74W, with maximum sustained winds of 110 kts with gusts to 135 kts (Category 3 on the Saffir-Simpson scale). This made Wilma the strongest hurricane to affect OPC's waters during the 2005 Atlantic season. Wilma then accelerated northeast in the warm sector of a developing non-tropical low-pressure area while weakening, but remaining a hurricane through late afternoon on the 25th before becoming extratropical at 0000 UTC October 26 (**Figure 3**). The ship **Pirate Expeditions** (WDC5736), well southeast of Wilma, near 32N 63W reported south winds of 35 kts and 8.0 m seas (27 ft) at 1200 UTC on the 25th. Other reports were closer to Wilma, but on the cold side of the

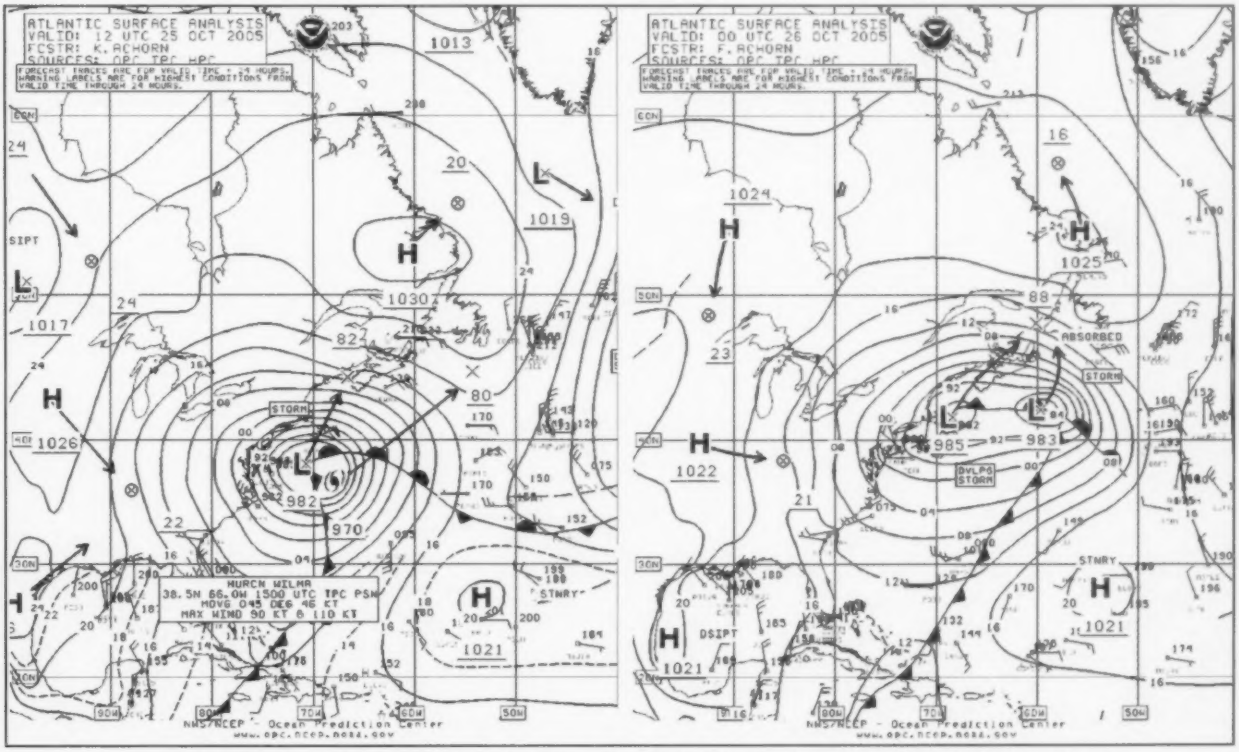


Figure 3. OPC North Atlantic Surface Analysis charts (Part 2 - west) valid 1200 UTC October 25 and 0000 UTC October 26, 2005. Hurricane Wilma is shown in transition to an extratropical storm.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND(kt)	SEAS(m/ft)
Undine (SHJC)	40N 70W	25/1200	NE 58	
Buoy 41002	32.3N 75.4W	25/0300	N 35 G43	3.0/10
		25/0800		maximum 7.5/25
Buoy 41001	34.7N 72.7W	25/1000	W 29 G39	2.5/8
		25/1400		6.5/21
Buoy 44008	40.5N 69.4W	25/1400	E 39 G 47	7.5/25
		25/1500	Peak gust 52	
		25/1300		maximum 8.5/28
Buoy 44005	43.2N 69.2W	25/1700	NE 39 G49	6.0/20
		25/1800	Peak gust 51	
		25/2300		maximum 7.5/25
Buoy 44137	42.3N 62.0W	25/2100	NE 43 G 56	7.5/25
Isles of Shoals (IOSN3)	43.0N 70.5W	25/1600	NE 46 G 56	

Table 2. Some ship, buoy and coastal C/MAN observations taken during passage of Wilma and associated extratropical low.

extratropical low northwest of Wilma, and are shown in ***Table 2***. Wilma's remains dissipated just south of the island of Newfoundland late on the 26th, while the parent low near the New England coast moved to the Canadian Maritimes as a gale.

Tropical Storm Delta: A strong cut-off low developed near 31N 40w early on November 21, remained nearly stationary through the 22nd while slowly intensifying, and then moving south of the waters. The **Chiquita Belgie** (C6KD7) near 31N 44W reported north winds of 45 kts at 1800 UTC on the 22nd. The low developed tropical characteristics south of the area late on the 23rd and was named Tropical Storm Delta, near 26N 40W. The cyclone drifted south, before accelerating northeast on the 26th and 27th. Although the center was well south of 31N prior to the 27th, the large circulation extended into OPC's high seas area. Delta became extratropical late on the 28th as it turned east along 30N and merged with a frontal zone. The **ship** (V2QL) (31N 12W) reported a north wind of 40 kts and seas 2.5 m (9 ft) at 1200 UTC November 29 as extratropical Delta was moving into Morocco.

Hurricane Epsilon: Epsilon formed from another non-tropical cutoff low near the southern edge of OPC's high seas area 700 nmi east of Bermuda on November 29. The low was upgraded to a tropical storm at 1500 UTC that day with maximum sustained winds of 40 kts with gusts to 50 kts. The cyclone drifted erratically westward through November 30 before turning more north and then northeast on December 1, while intensifying. Epsilon became a hurricane early on December 2 near 34N 48W with maximum sustained winds 65 kts with gusts to 80 kts. ***Figure*** 4 shows Epsilon near maximum intensity with a well-defined eye surrounded by a ring of cold-topped (enhanced) clouds. Although fronts are apparent in the image, especially the stronger one moving southeast of Newfoundland, Epsilon remained cut off from the westerlies. After weakening briefly to a tropical storm early on the 4th, Epsilon attained maximum intensity as a hurricane at 1500 UTC on the 4th with maximum sustained winds of 75 kts with gusts to 90 kts. The cyclone then turned more southeast, reaching 33N 34W late on the 5th before turning southwest and passing south of the area as a hurricane late on December 6. Epsilon then weakened to a tropical storm south of the area late on the 7th (***Figure 12***) and to a remnant low on the 8th.

Other Significant Events of the Period

North Atlantic Storm, September 28–30: The developing low and trailing cold front seen in the first part of ***Figure 5*** had absorbed the remains of Tropical Depression Rita over the central U.S. twenty-four hours earlier. The system rapidly intensified, especially after passing northeast of Newfoundland, with the second part of ***Figure 5*** showing the storm near maximum intensity. Available ship reports were mainly in the Labrador Sea on the 28th, with the vessel **Lykes Pioneer** (PDHW) reporting north winds of 40 kts near 53N 51W at 1200 UTC on the 28th. Six hours later, the ship **Sloman Provider** (DLBJ) (55N 51W) encountered north

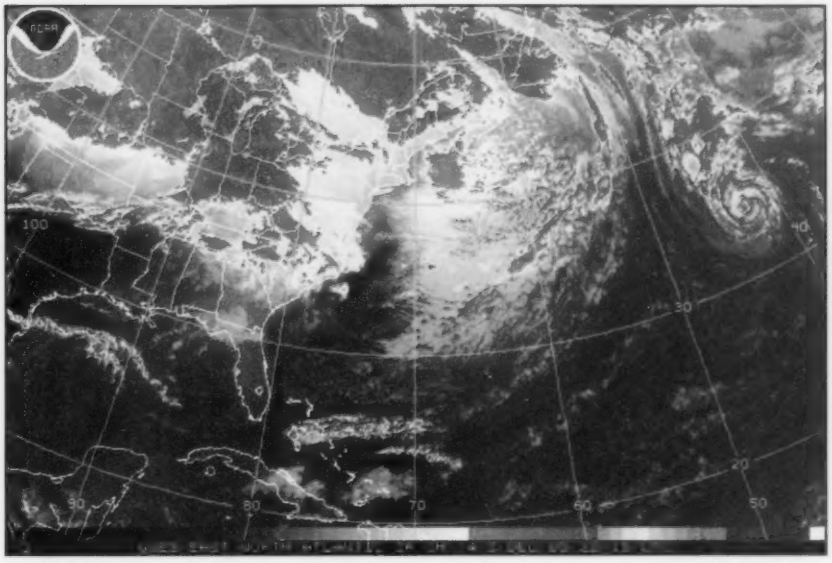


Figure 4. GOES-East enhanced infrared satellite image valid at 2215 UTC December 3, 2005, showing late-season Hurricane Epsilon near maximum intensity. Satellite senses temperature on a scale from black (warm) to white (cold) in this type of imagery, with the colder higher-topped clouds computer-enhanced.

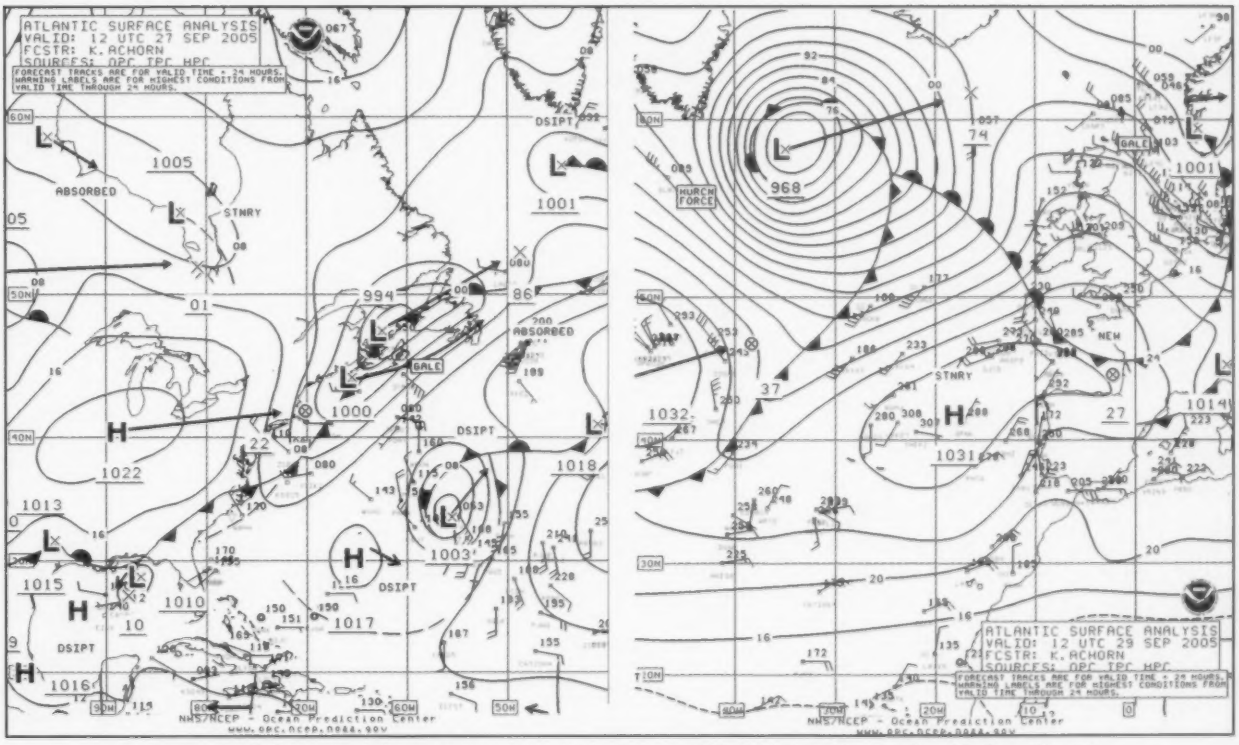


Figure 5. OPC North Atlantic Surface Analysis charts valid 1200 UTC September 27 (Part 2) and 1200 UTC September 29, 2005 (Part 1).

winds of 40 kts and 4.5 m seas (15 ft). The storm moved through an area of sparse ship data, but a QuikScat pass taken near the time of maximum intensity (***Figure 6***) reveals winds to 75 kts on the northwest and southwest sides of the storm. The wind directions appear to be dubious on the lower right side of the image. The southern tip of Greenland is near the upper left corner. The storm subsequently began to weaken and passed east of Iceland late on September 30.

Northeast Atlantic Storm, October 8–10: This development was similar to the previous but about 20 degrees of longitude farther east. The low center moved from 53N 42W to 57N 18W while the central pressure dropped 27 hPa, from 1000 hPa to 973 hPa, in the twenty-four hour period ending at 1200 UTC October 9. The **Charles Darwin** (GDLS) near 57N 10W reported south winds of 50 kts at this time. OPC briefly classified the system as a hurricane-force low six hours later when the low passed northwest of Great Britain, with a 969 hPa center. There was one wind barb with 65 kts in the afternoon high-resolution QuikScat pass on the 9th near northern Scotland (not shown). At 0000 UTC October 10 the **Nuka Arctica** (59N 9W) and the buoy 62138 (58.5N 2W) reported south winds of 50 kts. The system then weakened and passed northeast of Iceland on the 10th.

North Atlantic Storm, October 11–15: The development of this storm is shown in ***Figure 7***, with a track farther south than in the previous two events. The central pressure dropped an impressive 32 hPa in the twenty-four hours covered in ***Figure 7***, or more than 1 hPa per hour. The track took the rapidly deepening system over the Grand Banks platforms, with **Platform** (VEP717) (46.7N 48.7W) encountering northwest winds of 65 kts at 1800 UTC October 12, while nearby HP6038 (46.4N 48.4W) reported northwest winds of 55 kts. A high-resolution QuikScat pass taken a few hours later showed a swath of 50 to as high as 70 kts on the west northwest sides of the storm center. The system then moved east near 47N until late on the 13th, when it turned north. At 1200 UTC October 13 the **Atlantic Companion** (44N 40W) reported northwest winds of 60 kts. The system subsequently made a loop east of Greenland before stalling and weakening to a gale in the northeast Atlantic on the 16th.

Northwest Atlantic Storm of November 3–5: Low pressure moving off the Labrador coast absorbed another low riding north up the front during the twenty-four hour period ending at 0600 UTC November 4 (***Figure 8***). The primary low deepened 36 hPa in the twenty-four hour period ending at 0000 UTC on the 4th, while the secondary low intensified by an even more impressive 40 hPa in the twenty-four hour period ending at 1800 UTC on the 3rd, before merging with the main Labrador Sea low. The second part of ***Figure 8*** shows the storm at maximum intensity (943 hPa or 27.85 in), making it the most intense storm of the period not only in the North Atlantic, but in both oceans. **Platform** (VEP717) (46.7N 48.7W) reported south winds of 75 kts ahead of the front at 0600 UTC on the 3rd.

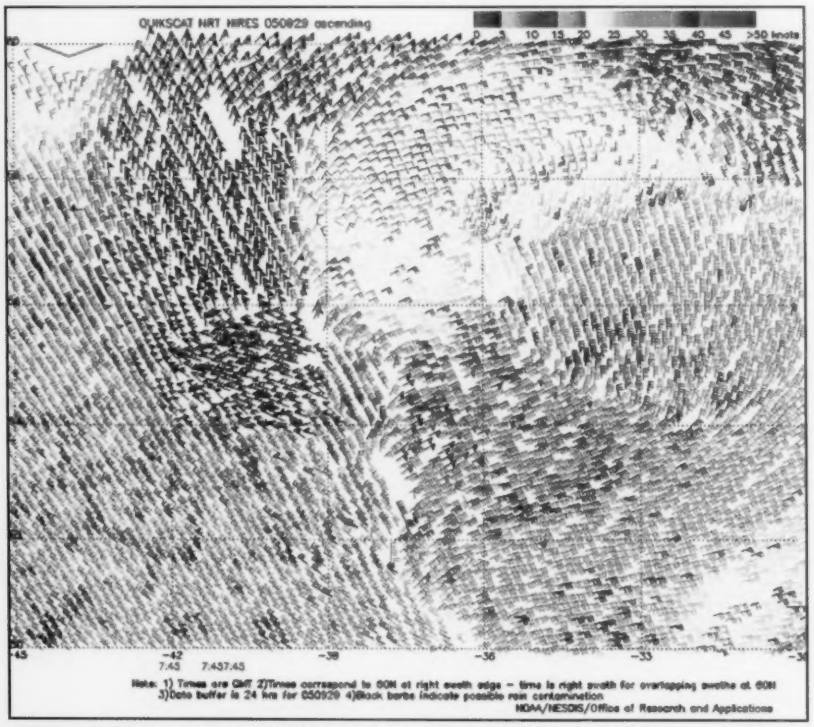


Figure 6. High-resolution QuikScat scatterometer image of satellite-sensed winds around the storm shown in *Figure 5*. The valid time of the pass is 0745 UTC September 29, 2005, or four and one-quarter hours prior to the valid time of the second part of *Figure 5*.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

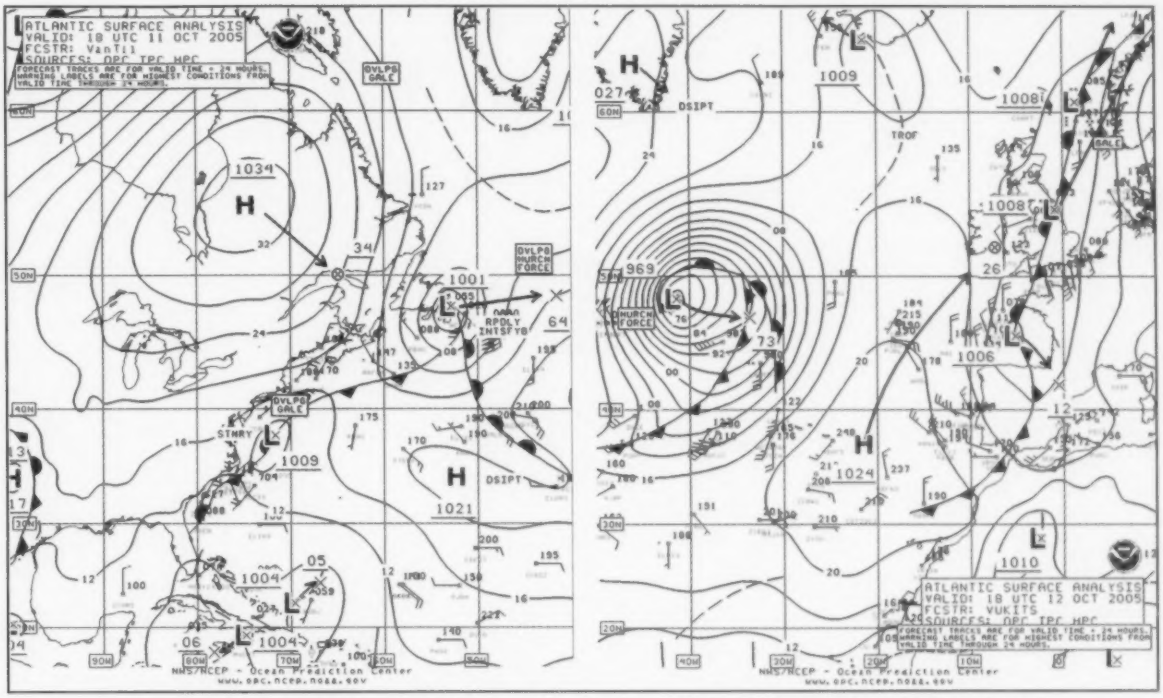


Figure 7. OPC North Atlantic Surface Analysis charts valid 1800 UTC October 11 (Part 2) and 1800 UTC October 12 (Part 1), 2005.

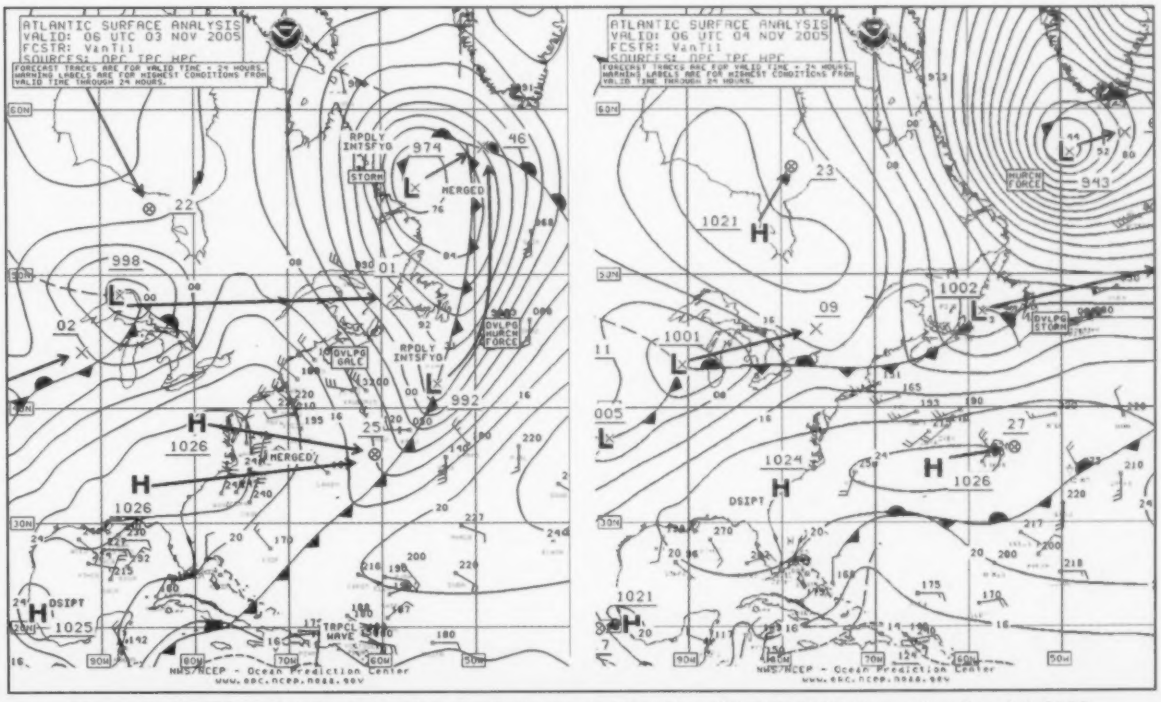


Figure 8. OPC North Atlantic Surface Analysis charts (Part 2) valid 0600 UTC November 3 and 4, 2005.

Behind the frontal system, the ship **Atlantic Cartier** (SCKB) (49N 44W) encountered west winds of 60 kts, but south of the area of strongest winds as shown in ***Figure 9*** with a valid time close to that of the second part of ***Figure 8***. A few 80 kts wind barbs appear in the northwest flow over the Labrador Sea, an area of sparse ship data. The storm subsequently weakened to a gale-force low while passing southeast of Greenland late on the 5th, before dissipating south of Iceland late on the 7th.

North Atlantic Storms, November 8–12: The primary system, like the preceding storm described above, developed in the Labrador Sea on November 8 but was not nearly as intense. This low deepened to 964 hPa while passing east of Greenland near 61N 31W early on the 9th. The first part of ***Figure 10*** depicts the Greenland system after completing a loop, briefly developing hurricane-force winds before heading southeast, while a secondary low develops west of Great Britain. The second part of ***Figure 10*** shows the secondary low becoming the main system with hurricane-force winds. ***Figure 11*** is a high-resolution QuikScat image revealing hurricane-force west winds on the back side of the storm, including one 80 kts wind barb. The **ship** (MHN06) (49N 15W) reported west winds of 50 kts at 0600 UTC on the 11th, and Buoy 62105 (55.4N 12.5W) had west winds of 50 kts and 9.0 m seas (30 ft) four hours later. The storm subsequently weakened and continued on a northeast track into Norway late on the 12th.

North Atlantic Storms, December 5–9: With increased blocking in the eastern Atlantic from late November into early December, the three major storms described in the remainder of this article followed more northward tracks toward the Greenland area after initiating near or off the U.S. East Coast. The first low originated south

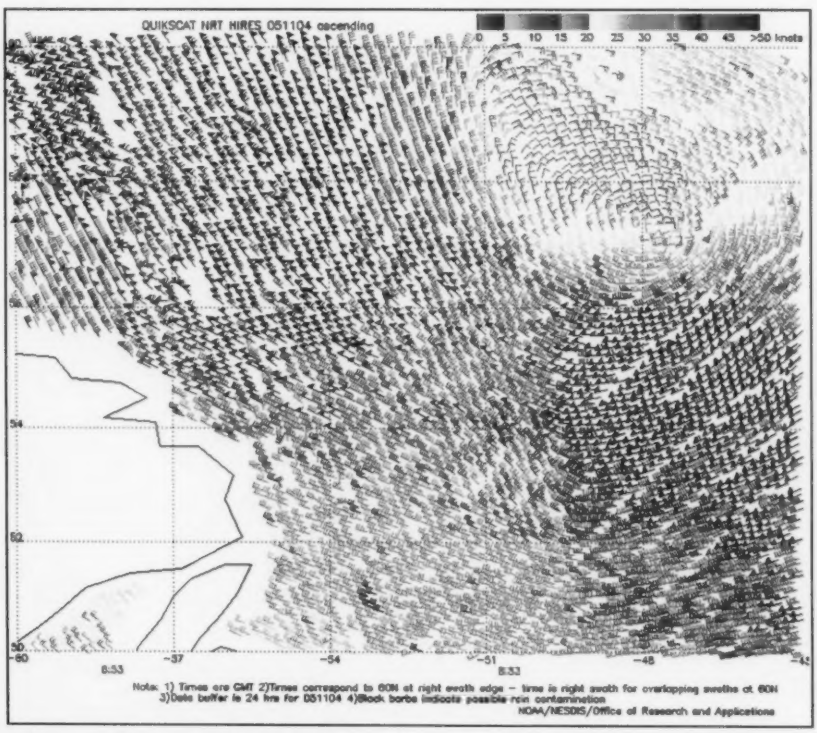


Figure 9. High-resolution QuikScat scatterometer image of satellite-sensed winds displaying the stronger winds around the south and west sides of the storm in the second part of *Figure 8*, valid at 0853 UTC November 4, 2005. The valid time of the pass is about three hours later than the valid time of the second part of *Figure 8*.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

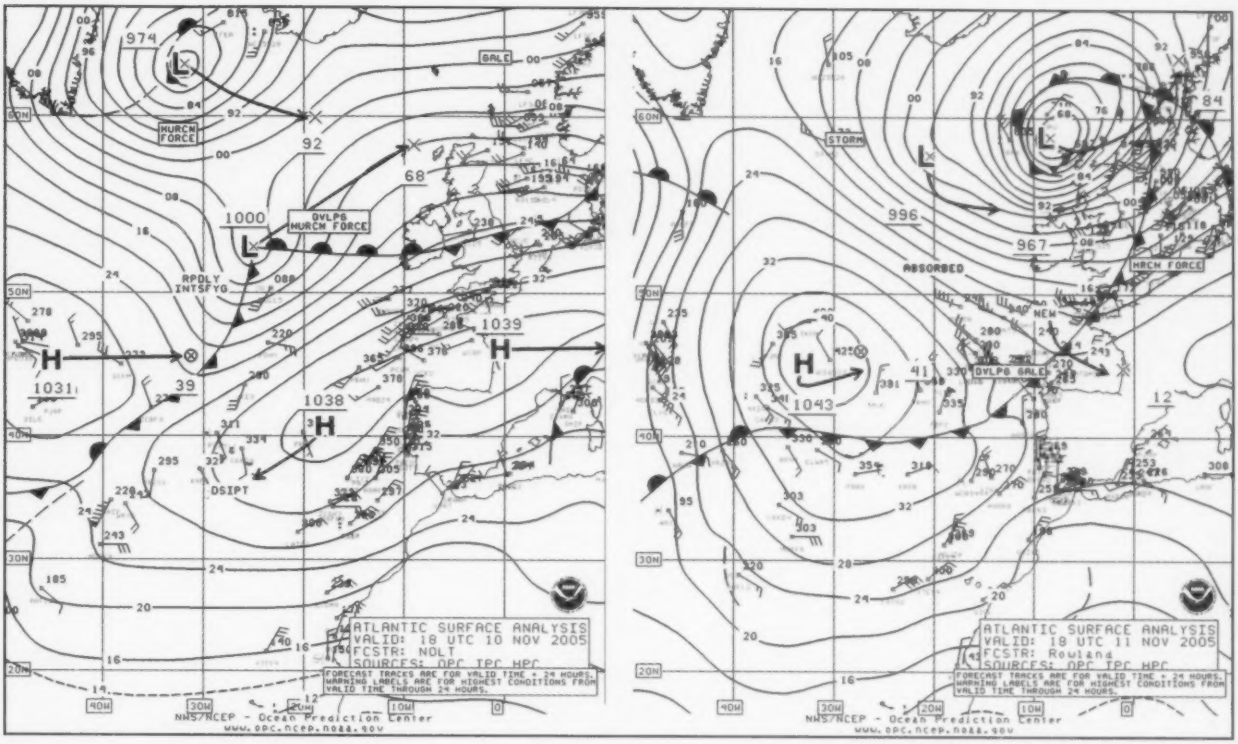


Figure 10. (above) OPC North Atlantic Surface Analysis charts (Part 1) valid 1800 UTC November 10 and 11, 2005.

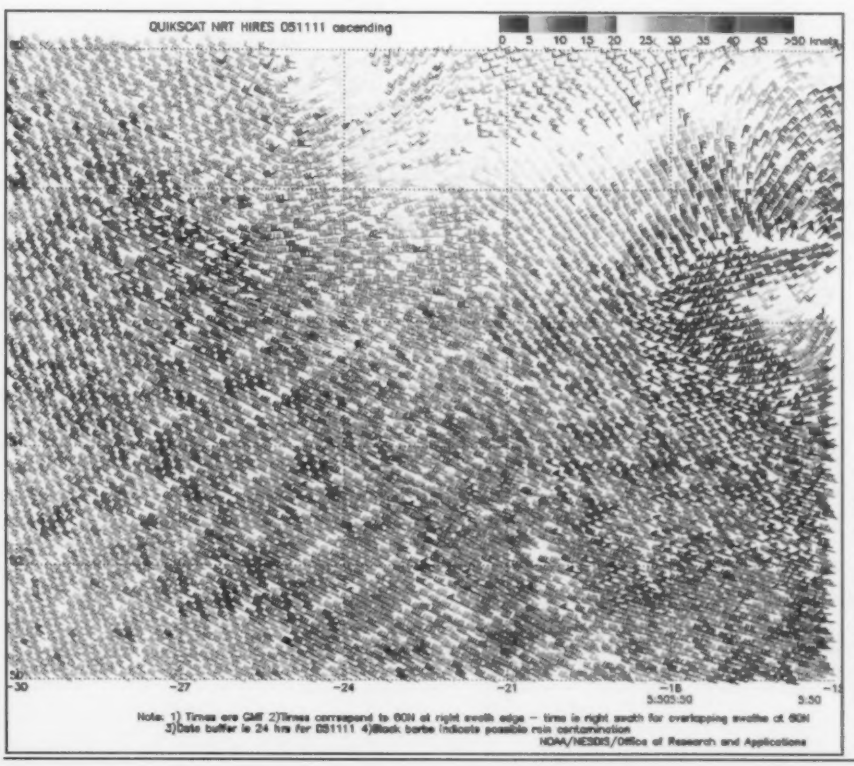


Figure 11. (left) High-resolution QuikScat scatterometer image of satellite-sensed winds around the west semicircle of the storm shown in *Figure 10*. The valid time of the pass is 0550 UTC November 11, 2005, or about twelve hours prior to the valid time of the second analysis in *Figure 10*.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

of Nova Scotia near 41N late on December 4 and deepened rapidly over a thirty-six hour period, leading to the 952 hPa hurricane-force storm in the first part of ***Figure 12***. The central pressure dropped an impressive 38 hPa in the twenty-four hour period leading up to 1200 UTC December 6. The system that followed, shown developing from an open frontal wave of low pressure off the U.S. mid-Atlantic coast, appears with a 952 hPa central pressure in the second part of ***Figure 12***, also down 38 hPa in the preceding twenty-four hours. The central pressure bottomed out at 947 hPa six hours later, making the storm the second deepest of the period in the North Atlantic. With the passage of the first low, winds at the **platform** VEP717 (46.7N 48.7W) reached 60 kts from the southwest at 0000 UTC December 6, accompanied by seas of 7.5 m (24 ft). The second low produced winds as high as 55 kts from the west at the same platform. The QuikScat data in ***Figure 13*** reveals hurricane-force winds as high as 70 kts on the south and southeast sides of the well-defined storm center near 58N 37W, in an area lacking in ship reports. High-resolution QuikScat winds from the first storm near 0000 UTC December 6 revealed winds of similar strength south of the center. The second storm absorbed the first east of Greenland on the 8th, and then weakened to a gale while passing between Greenland and Iceland early on the 9th. The third storm in the series, with different impact, is described below.

Coastal Storm, December 9–10: Unlike the two predecessors, the next low underwent very rapid initial intensification in the first twelve hours after leaving the U.S. mid-Atlantic coast, as shown in ***Figure 14***. The central pressure dropped 26 hPa in only twelve hours and winds quickly increased to hurricane force from the eastern New England waters to south of Nova Scotia late on the 9th.

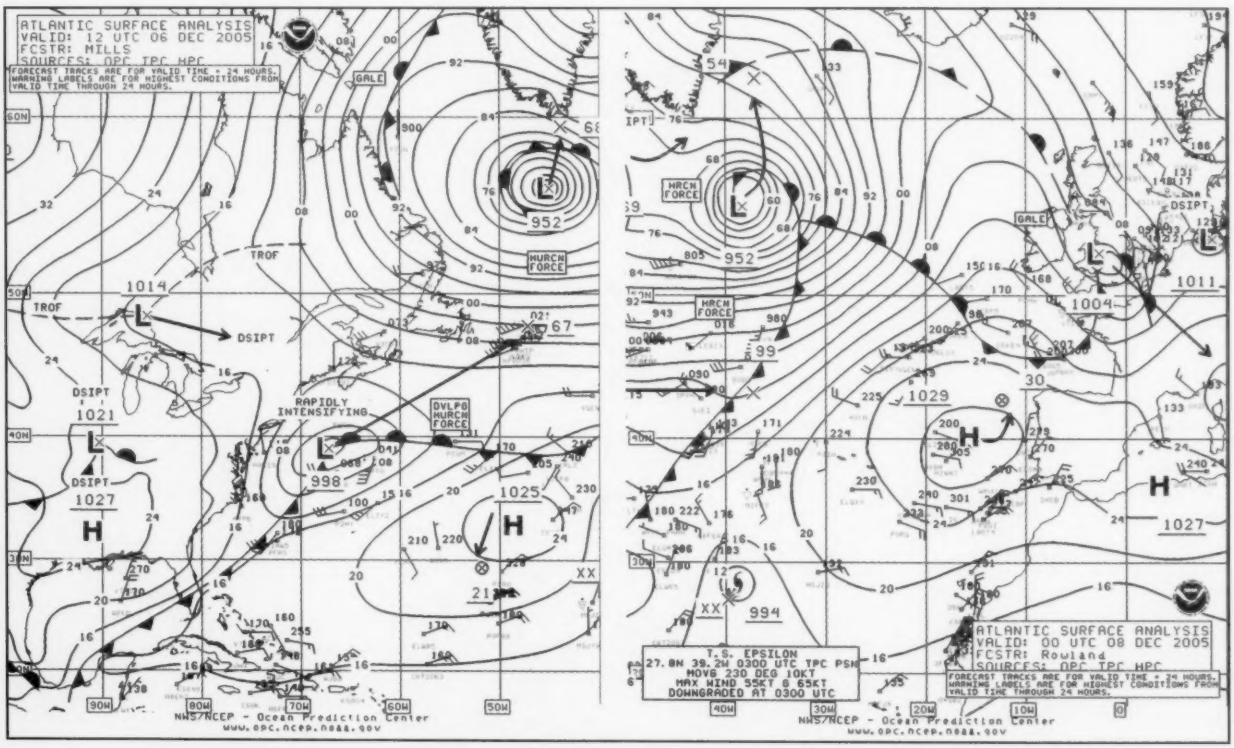


Figure 12. OPC North Atlantic Surface Analysis charts valid 1200 UTC December 6 (Part 2) and 0000 UTC December 8, 2005.

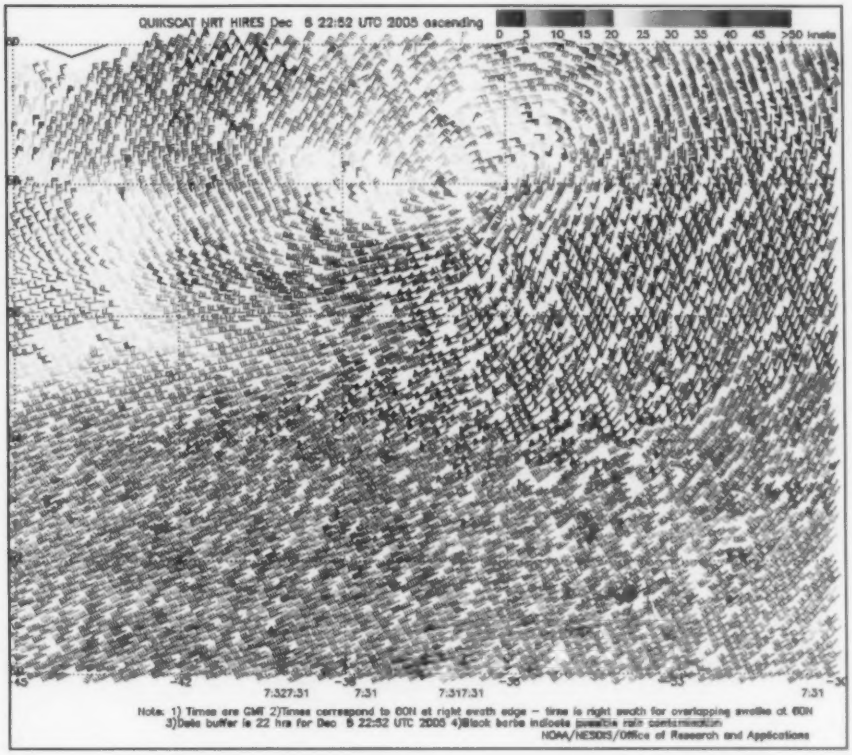
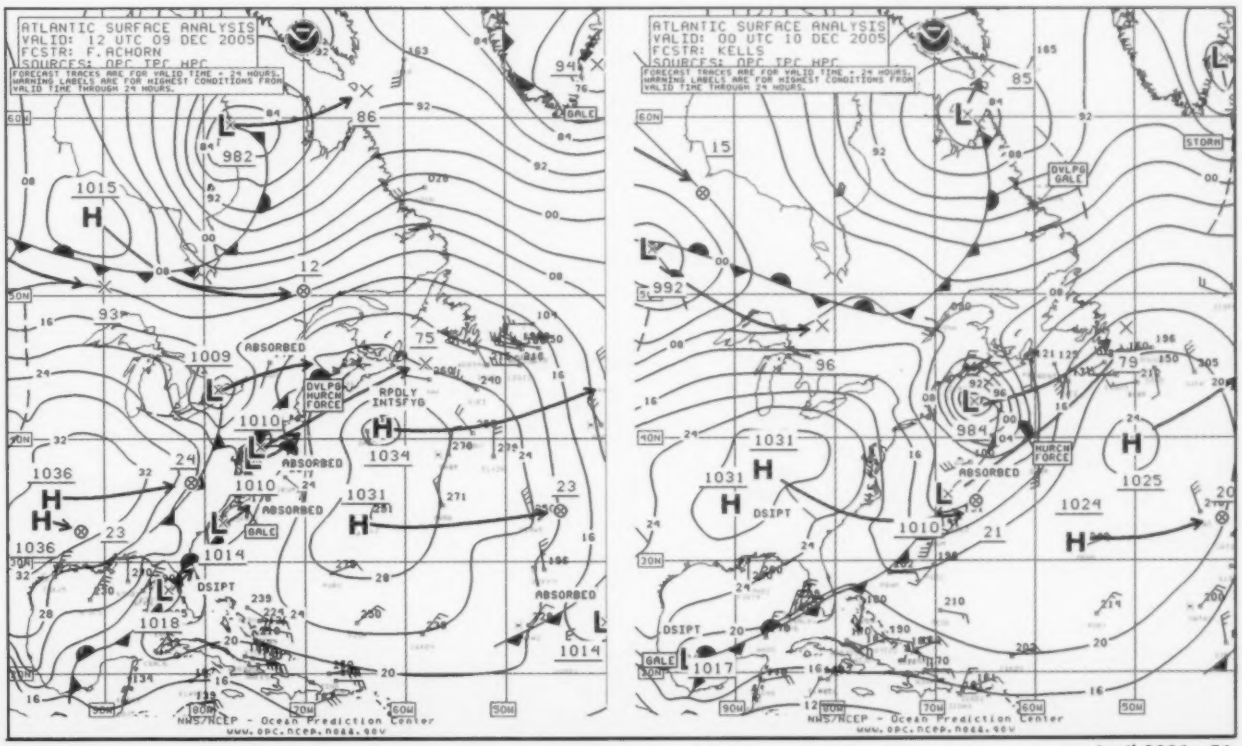


Figure 13. (left) High-resolution QuikScat scatterometer image of satellite-sensed winds around the storm shown in the second part of *Figure 12*. The southern tip of Greenland is near the upper-left corner of the figure. The valid time of the pass is 0731 UTC December 8, 2005, or about seven and one-half hours later than the valid time of the second part of *Figure 12*.

Image is courtesy of NOAA/NESDIS/Office of Research and Applications.

Figure 14. (below) OPC North Atlantic Surface Analysis charts (Part 2) valid 1200 UTC December 9 and 0000 UTC December 10, 2005.



High-resolution scatterometer winds were available for 2234 UTC on the 9th, revealing west winds 50 to 65 kts and as high as 70 kts from the southern Gulf of Maine to east of Cape Cod. These winds are reflected in the gust speeds reported at some of the buoys and C/MAN stations in the area as shown in ***Table 3***. The cyclone attained a maximum intensity of 978 hPa while passing 180 nmi south of Newfoundland early on the 10th, and then turned more north and began to weaken, passing northwest of Iceland as a gale on December 12.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND(kt)	SEAS(m/ft)
Maersk Skagen (ELVX2)	40N 72W	09/1800	W 44	
Nordon (PBHU)	46N 58W	10/1200	N 55	
Buoy 44004	38.5N 70.5W	09/1600	S 37 G47	3.0/10
Buoy 44017	40.7N 72.0W	09/1800	W 41 G49	2.5/8
			Peak gust 58	
		09/1900		maximum 4.0/13
Buoy 44008	40.5N 69.4W	09/2100	W 41 G52	4.5/15
		10/0100		maximum 6.5/21
Buoy 44029	42.5N 70.6W	09/2000	NW 47 G72	2.5/8
		09/2100		maximum 3.0/10
Buoy 44018	41.3N 69.3W	09/2100	W 43 G54	4.0/13
			Peak gust 58	
		09/2300		maximum 5.5/18
Buoy 44005	43.2N 69.2W	09/2200	N 33 G41	2.5/8
		10/0100	Peak gust 45	
		10/0200		maximum 3.5/11
Buoy 44137	42.3N 62.0W	10/0600	W 52 G64	7.0/23
		10/0700	Peak gust 66	
		10/0900		maximum 9.5/31
Buzzards Bay (BUZM3)	41.4N 70.9W	09/1900	NW 59 G 69	

Table 3. Some ship, buoy and coastal C/MAN observations taken during passage of the coastal storm of December 9-10.

References

1. From Tropical Prediction Center website, http://www.nhc.noaa.gov/aboutsshs.shtml.

2. From Tropical Prediction Center website, http://www.nhc.noaa.gov/archive/2005.

3 Sienkiewicz, J. and Chesneau, L., Mariner's Guide to the 500-Mb Chart (Mariners Weather Log, Winter 1995).

Marine Weather Review—North Pacific Area September through December 2005

By George P. Bancroft, NOAA National Center for Environmental Prediction

Introduction

This four-month interval is typically a period of maximum tropical cyclone activity in the western Pacific and increasing number and intensity of non-tropical systems as autumn progresses into winter. Tropical activity was down during this period compared to the same period in 2004, with the current four-month period producing only four tropical cyclones coming out of the western tropical Pacific and entering OPC's oceanic surface analysis area. All of these occurred early in the period, through mid-October, with the first redeveloping into a powerful hurricane-force low after becoming extratropical. October and December were most active with respect to hurricane-force lows, producing 5 and 6, respectively, while September and November had three each.

Due to the sheer number of strong systems during these stormy months, this article focuses mainly on hurricane-force lows and tropical cyclones.

Tropical Activity

Super Typhoon Nabi: Nabi, a left-over tropical cyclone from late August, intensified to a super typhoon by 1800 UTC on September 1 while moving northwest. The center was at maximum intensity at that time, near 19N 139E with maximum sustained winds of 140 kts with gusts to 170 kts, making Nabi the stronger of two super typhoons occurring during this period. The **Condoleezza Rice** (C6OK) reported near 18N 146E with a south wind of 35 kts at that time. The cyclone remained a super typhoon while tracking west-northwest about 800 nmi south of Japan, and then passed west of the area while slowly weakening on September 3. The ship **Puteri Delima Satu** (9MEU4) (27N 137E) and the **Northwest Seaeagle** (ZCAS2) (27N 135E) both reported southeast winds of 50 kts at 0000 UTC and 1200 UTC September 5, respectively. Nabi subsequently recurved northeast into the Sea of Japan and became extratropical late on the 6th, redeveloping into a hurricane-force storm near the northern Kurile Islands during a forty-eight hour period ending at 1800 UTC September 8 (***Figure 1***). At 1200 UTC on the 8th the **Chebarkul** (UDKO) (50N 156E) encountered east winds of 60 kts. The high-resolution QuikScat pass in ***Figure 2*** reveals winds to 65 kts in the southern Sea of Okhotsk on the southwest side of the storm. The system then began a slow weakening trend while moving along 50N, and then northeast into the Bering Sea on the 10th, where it weakened to a gale on the 11th. The remains of Nabi then moved into northwest Alaska late on the 12th.

Typhoon Saola: Tropical Depression 18W formed from a non-tropical low near 21N 152E early on September 20 and was named Tropical Storm Saola later that day while moving northwest, with maximum sustained winds of 35 kts and gusts to 45 kts. Late on 21st Saola became a typhoon near 25N 146E with maximum winds of 70 kts with gusts to 85 kts. The cyclone developed a maximum intensity of 100 kts sustained with gusts to 125 kts while 250 nmi southeast of Tokyo early on the 24th, before turning northeast and beginning to weaken. At 0000 UTC September 25 the **Arctic Sun** (ELQB8) near 35N 139E reported northeast winds of 50 kt. Saola then weakened to a tropical storm near 37N 146E at 1800 UTC on the 25th and to an extratropical gale-force low late on the 25th.

Extratropical Saola briefly re-intensified to a 1000 hPa storm near 39N 157E at 0000 UTC on the 27th, when the **Chembulk Vancouver** (DGVC) encountered northeast winds of 55 kts near 41N 161E. The system weakened again by the 27th while tracking east-northeast, and moved onshore near Vancouver Island on September 29.

Super Typhoon Longwang: Tropical Depression 19W formed near 19N 143E at 0000 UTC September 26 and was named Tropical Storm Longwang six hours later while moving northwest, with maximum sustained winds of 35 kts with gusts to 45 kts. Longwang became a typhoon near 22N 141E at 0000 UTC on the 27th with 70 kts maximum winds and gusts to 85 kts, and then turned west between 22N and 23N on the 27th. The cyclone intensified to a super typhoon with maximum sustained winds of 130 kts with gusts to 160 kts early on September 29 while passing west of OPC's oceanic chart area.

Typhoon Kirogi: Kirogi was a strong typhoon while moving northeast into OPC's oceanic chart area, 550 nmi south of Japan early on October 16.

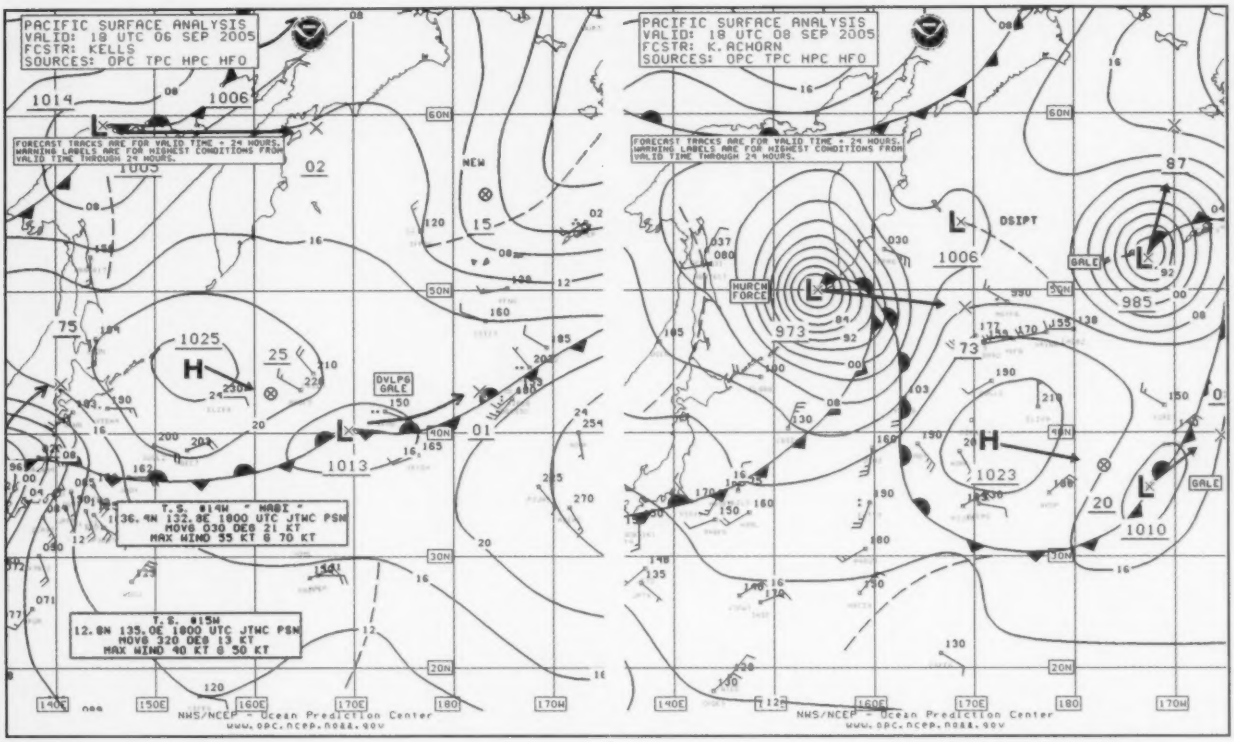


Figure 1. (above) OPC North Pacific Surface Analysis charts (Part 2 - west) valid 1800 UTC September 6 and 8, 2005. Tropical Storm Nabi, just west of Japan, is depicted becoming an extratropical hurricane-force storm.

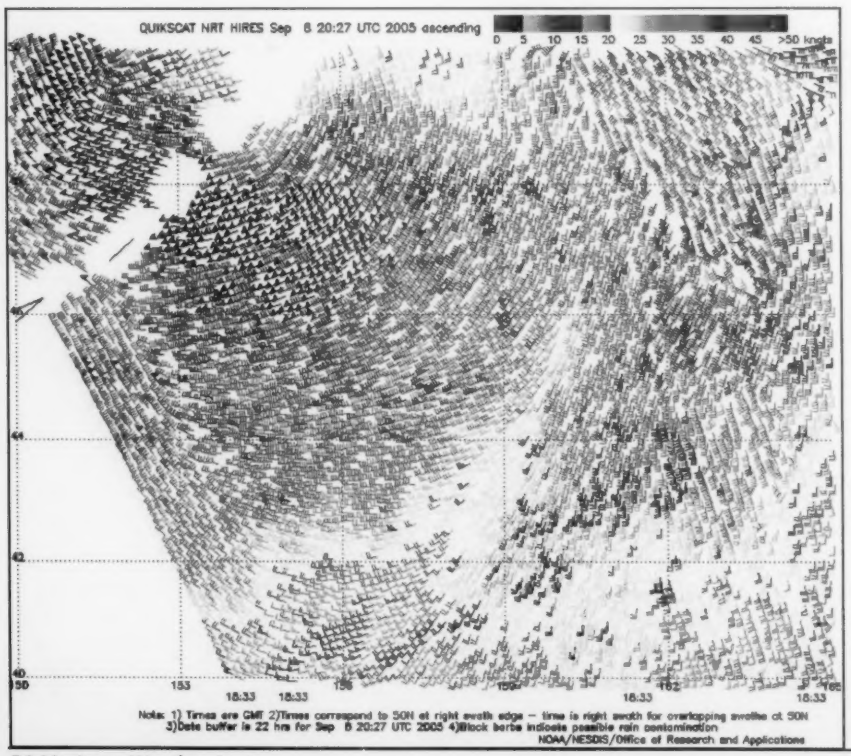


Figure 2. (left) High-resolution QuikScat scatterometer image of satellite-sensed winds valid at 1833 UTC September 8, 2005, close to the valid time of *Figure 1*. The resolution is 12.5 km, versus the 25 km resolution of regular QuikScat imagery.
Image is courtesy of NOAA/NESDIS /Office of Research and Applications.

The maximum sustained winds were 125 kts with gusts to 150 kts, just below super-typhoon strength. Kirogi weakened to a tropical storm near 33N 141E at 1800 UTC on the 18th, and became an extratropical gale-force low six hours later. The remains of Kirogi then continued moving northeast without redevelopment.

Other Significant Events

Bering Sea Storm, September 22–23: One of two other brief hurricane-force events in September, this low originated as a frontal wave of low pressure near 42N 162E early on September 21 and moved northeast while rapidly intensifying. The center reached 60N 174W with a pressure of 969 hPa at 1800 UTC on the 22nd, after the central pressure fell 34 hPa in the preceding twenty-four hours. The storm briefly developed hurricane-force winds six hours later, when the lowest pressure of 962 hPa was reached. The **Guardsman** (WBN5978) near 60.5N 167W reported south winds of 60 kts at that time. The system then weakened and passed north of the Bering Strait on the 23rd.

Gulf of Alaska Storm of September 26–28: This cyclone originated in the same general area as was the case with the Bering storm above, but the track was just south of the central Aleutians late on the 25th and just south of the Alaska Peninsula early on the 27th. The cyclone briefly developed hurricane-force winds ahead of a strong frontal system approaching the southern coast of mainland Alaska at 1800 UTC September 27. The storm center developed a lowest central pressure of 967 hPa (near 55N 158W) at that time. Some notable observations taken in this storm are listed in ***Table 1***. The front moved onshore shortly thereafter and the storm center stalled and weakened in the Gulf of Alaska.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND(kt)	SEAS(m/ft)
Caribe Challenger (WDA3588)	55.5N 160.6W	26/2000-27/0200	E 60	
SeaLand Kodiak (KGTZ)	57N 150W	27/0000	E 50	
WCZ7337	60N 147W	27/1900	E 50	
WDB7583	59.7N 151.9W	27/2100	NE 60	
Buoy 46082	59.7N 143.4W	27/2100	E 45 G58	7.0/23
			Peak gust 64	
		27/2200		maximum 9.0/30
Buoy 46076	59.5N 148.0W	27/1900	E 41 G52	8.0/26
			Peak gust 60	
		27/2200		maximum 8.5/28
East Amatuli Island (AMAA2)	59N 152W	27/1829	NE 62	
		27/1900	Peak gust 78	
St. Augustine Island (AUGA2)	59.4N 153.4W	27/2100	NE 54 G67	

Table 1. Some ship, buoy and coastal C/MAN observations taken during storm of September 26–28. The term "maximum" as applied to seas means highest significant wave height observed.

Twin Hurricane-Force Lows, North Pacific October 8–11: ***Figure 3*** depicts two hurricane-force lows appearing at the same time and near maximum intensity. The Bering Sea storm originated near Japan early on October 8 and developed hurricane-force winds early on the 9th. The cyclone maintained hurricane-force strength until early on the 10th while tracking east and beginning to weaken, and weakened to a gale-force low upon reaching the Gulf of Alaska on the 12th. The eastern storm originated well south of the eastern Aleutians near 45N on October 7, with the central pressure dropping 27 hPa in the twenty-four hour period ending at 1200 UTC on the 9th. The system is at maximum intensity in ***Figure 3***. The cyclone then quickly moved inland and weakened early on the 10th. This event featured ship reports with hurricane-force winds, which are included in ***Table 2***.

North Pacific Storm, October 13–15: This developing storm originated east of Japan near 35N 157E early on October 12, and rapidly intensified while tracking northeast (***Figure 4***). The central pressure fell 21 hPa in the twenty-four hour period ending at 0600 UTC on the 14th. The storm is shown with a central pressure of 967 hPa, at maximum intensity, in the second part of ***Figure 4***. At 0600 UTC October 13 the **CCNI Busan** (V7CG8) (38N 167E) encountered

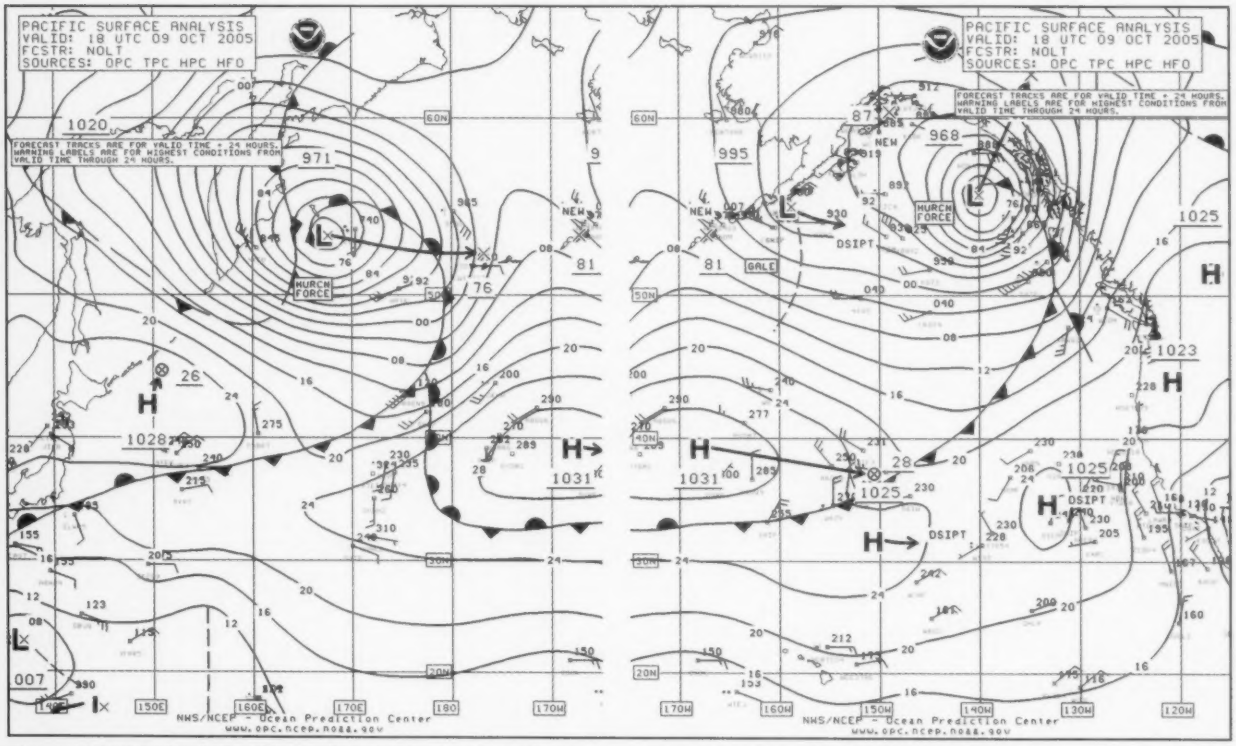


Figure 3. OPC North Pacific Surface Analysis charts (Parts 1 and 2) valid 1800 UTC October 9, 2005. Twin hurricane-force storms are shown near maximum intensity.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND(kt)	SEAS(m/ft)
Polar Eagle (ELPT3)	48N 163E	09/0600	SW 50	
	49.5N 165E	09/1200	W 55	
	50N 167E	09/1700	W 60	
	50.5N 168E	09/1900	W 65	
	50.7N 169E	09/2300	W 75	
CSX Spirit (WFLG)	48N 164E	10/0000	NW 40	10.0/33
Zim Atlantic (4XFD)	50N 157E	10/0600	NW 55	
SeaLand Anchorage (KGTX)	54N 136W	09/2000	SW 50	9.5/31
	54.3N 136.7W	09/2100	SW 70	11.5/38
North Star (KIYI)	55N 137W	09/2000	S 40	9.5/31
Buoy 46184	53.9N 138.8W	09/2100	SW 45	8.2/27

Table 2. Ship and buoy observations taken in the twin hurricane-force storms of October 8–11.

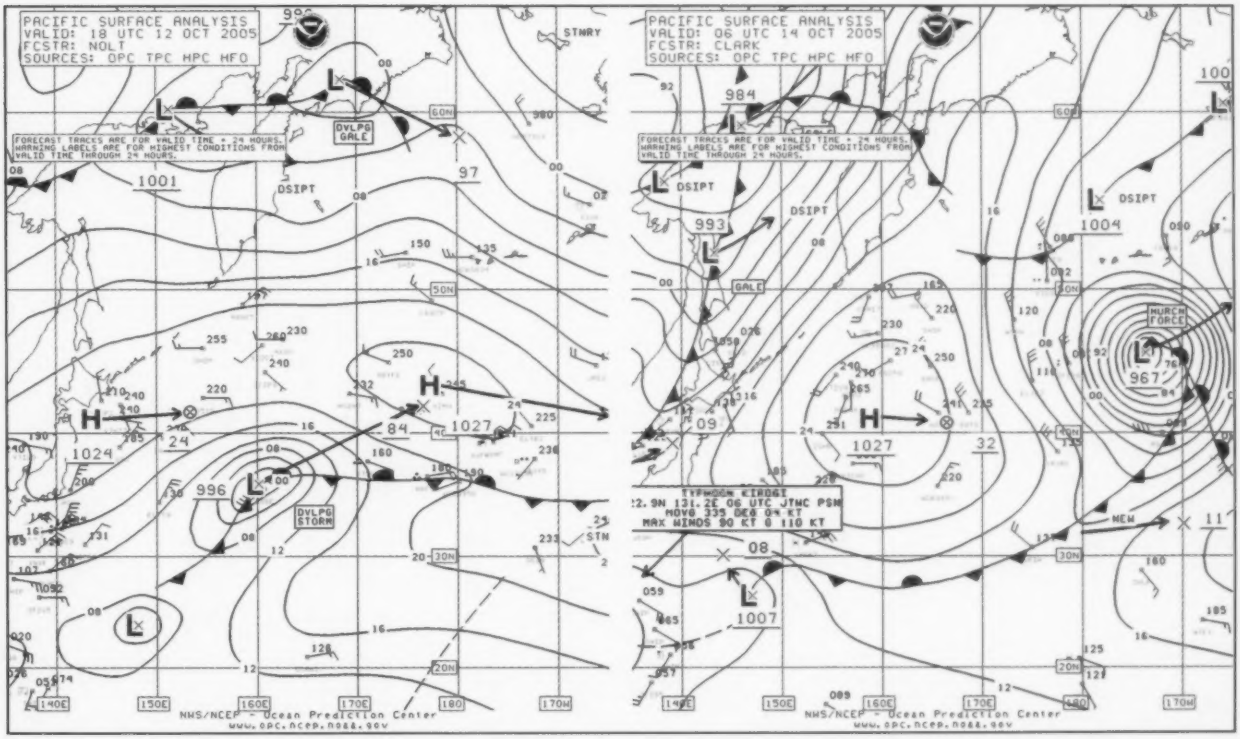


Figure 4. OPC North Pacific Surface Analysis charts (Part 2) valid 1800 UTC October 12 and 0600 UTC October 14, 2005.

north winds of 55 kts. A high-resolution QuikScat pass in ***Figure 5*** reveals numerous wind barbs in the 50 to 70 kts range around the south and west sides of the well-defined storm center near 45N 175W, in an area that is otherwise lacking in ship data. The system began weakening late on the 14th while continuing to move northeast, becoming a gale-force low on the 15th and then moving onshore in Southeast Alaska late on the 16th.

Bering Sea Storm of October 16–17: This event was similar to the one in late September. An area of low pressure moved northeast through the Bering Sea on October 16 and early October 17 while rapidly deepening, with the central pressure dropping 33 hPa in the twenty-four hour period ending at 0600 UTC on the 17th. The lowest pressure was 962 hPa, as in the September event, reached when the center was in the northeast Bering Sea early on the 17th. A QuikScat pass on the morning of the 17th showed a small area of 65 to 70 kts northwest winds near 59N 167W. The **ship** (WDB7918) (59N 172W) reported northwest winds of 60 kts at 1200 UTC on the 17th, while the vessel **Hat Trick** (WCY8812) (54.2N 163W) encountered southwest winds of 55 kts. The central Bering Sea buoy 46035 (57.1N 177.6W) reported northwest winds of 47 kts with gusts to 56 kts and 4.5 m seas (15 ft) at 0500 UTC on the 17th, followed by a peak gust of 62 kts one hour later. At 1100 UTC on the 17th the same buoy reported highest seas of 7.5 m (25 ft). The storm then weakened inland over Alaska later on the 17th.

Northeast Pacific Storm, October 19–21: The rapid development of this hurricane-force storm over a thirty-six hour period is shown in ***Figure 6***, and involved the merging of northern and southern lows. The lowest central pressure of 955 hPa reached at 0000 UTC on the 21st made this cyclone one of the deepest of the period in the North Pacific. There was abundant ship and buoy data around the low but not in the area of strongest winds southwest of the center. A high-resolution QuikScat pass (***Figure 7***) shows this area, containing wind barbs up to 70 kts. Other observations

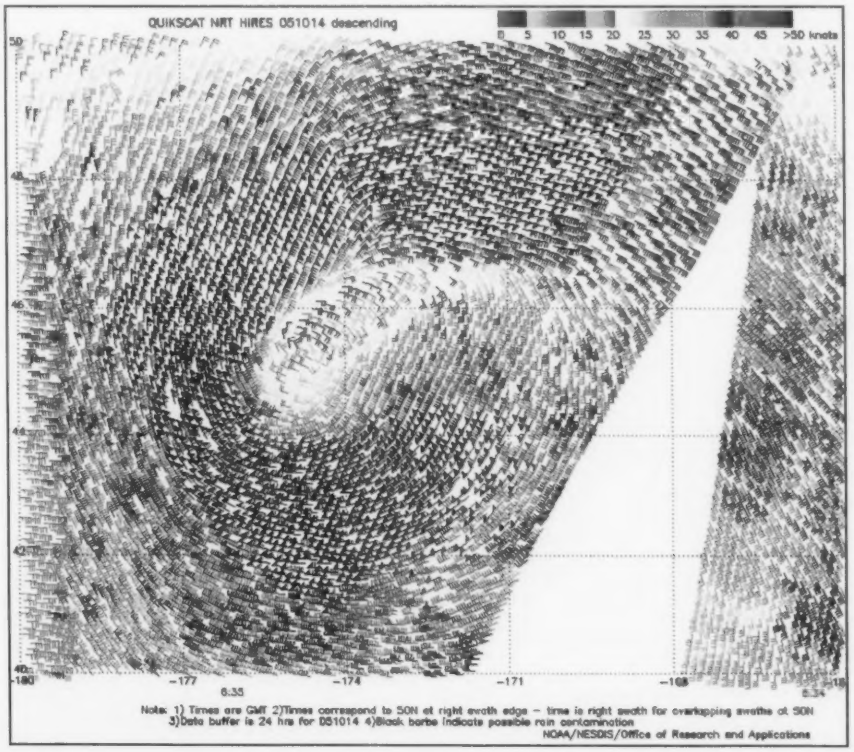


Figure 5. High-resolution QuikScat scatterometer image of satellite-sensed winds around the storm shown in *Figure 4*. The valid time of the pass is 0835 UTC October 14, 2005, or about two and one-half hours later than the valid time of the second part of *Figure 4*.
Image is courtesy of NOAA/NESDIS/ Office of Research and Applications.

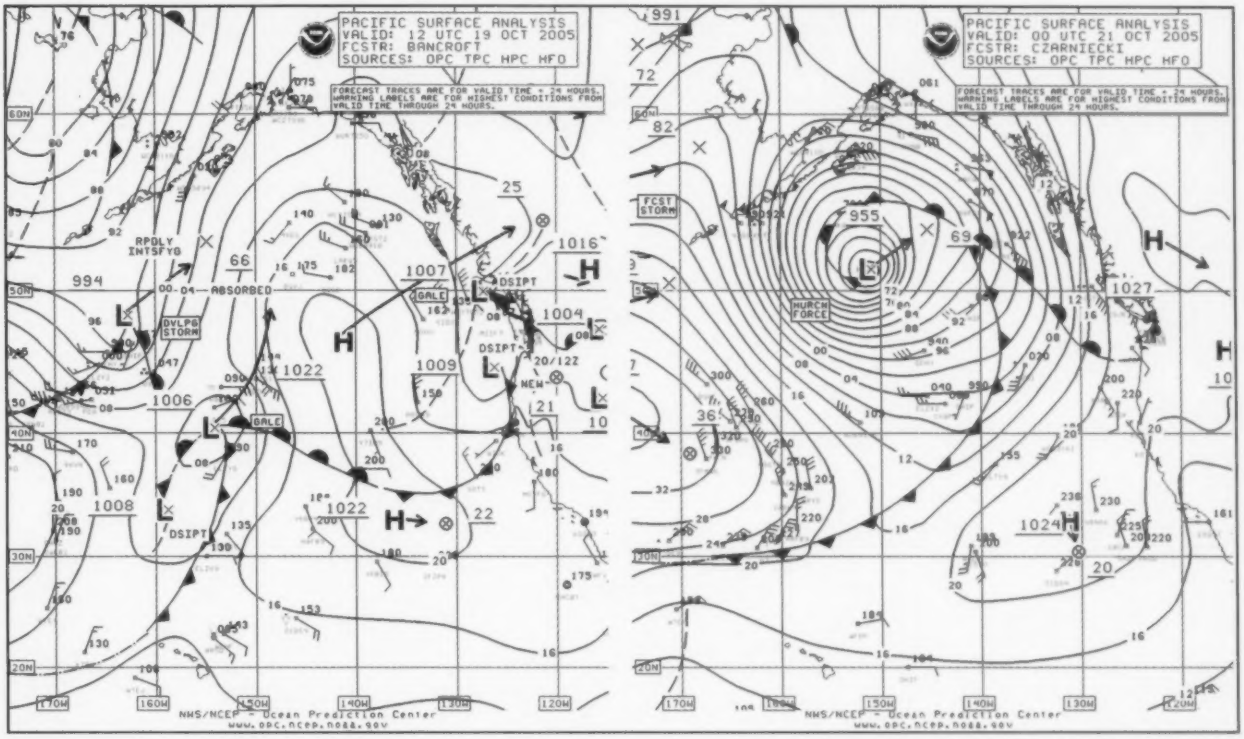


Figure 6. (above) OPC North Pacific Surface Analysis charts (Part 1 - east) valid 1200 UTC October 19 and 0000 UTC October 21, 2005.

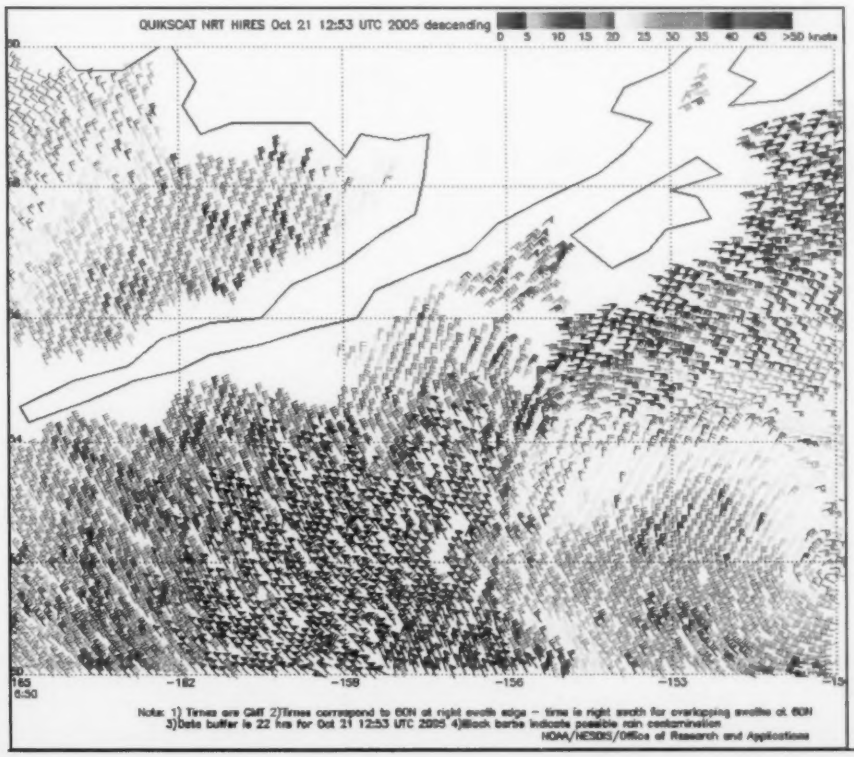


Figure 7. (left) High-resolution QuikScat scatterometer image of satellite-sensed winds around the west and northwest sides of the storm shown in *Figure 6*. The valid time of the pass is 0650 UTC October 21, 2005, or six and one-half hours later than the valid time of the second part of *Figure 6*. The center of the storm is apparent near the lower right edge of the figure.
Image is courtesy of NOAA/NESDIS/ Office of Research and Applications.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND(kt)	SEAS(m/ft)
ZimCanada (4XGS)	55N 152W	20/0000	S 50	8.8/29
Ship (ELYP2)	44.5N 170.6W	20/0000	NW 45	10.5/34
APL New York (A8GS3)	40N 162W	20/0600	W 55	
Star Geiranger (LAKQ)	43.7N 152W	20/1800	SW 50	12.8/42
Zim Canada (4XGS)	54N 162W	20/1800	NW 60	
SeaLand Tacoma (KGTY)	54N 162W	21/0000	NW 60	9.0/30
Polar Discovery (WACW)	58.6N 143.2W	21/0600	E 60	8.5/28
Buoy 46634	48.1N 162.3W	20/0400	NW 55	
Buoy 46075	53.9N 160.8W	20/1800	8.5/28	
Buoy 46078	56.1N 152.5W	20/1900	NE 41 G51	7.5/25
		20/2200		maximum 10.0/33
Buoy 46080	58.0N 150.0W	21/0500	NE 39 G51	8.5/28
		21/0600	Peak gust 56	
		21/0600		maximum 10.0/33
Buoy 46061	60.2N 146.9W	21/0900	E 37 G49	5.5/18
		21/1200		maximum 7.0/23
Buoy 46084	56.6N 136.2W	21/0900	SE 41 G52	7.0/23
			Peak gust 58	
		21/1200		maximum 8.0/26
Buoy 46205	54.2N 134.3W	21/0700	SE 41 G56	8.0/26
Buoy 46207	50.9N 129.9W	21/0900	SE 39 G52	7.0/23
Buoy 46147	51.8N 131.2W	21/0500	SE 39 G51	7.0/23
		21/0900		maximum 8.0/26

Table 3. Selected ship and buoy observations taken in the storm of October 19-21.

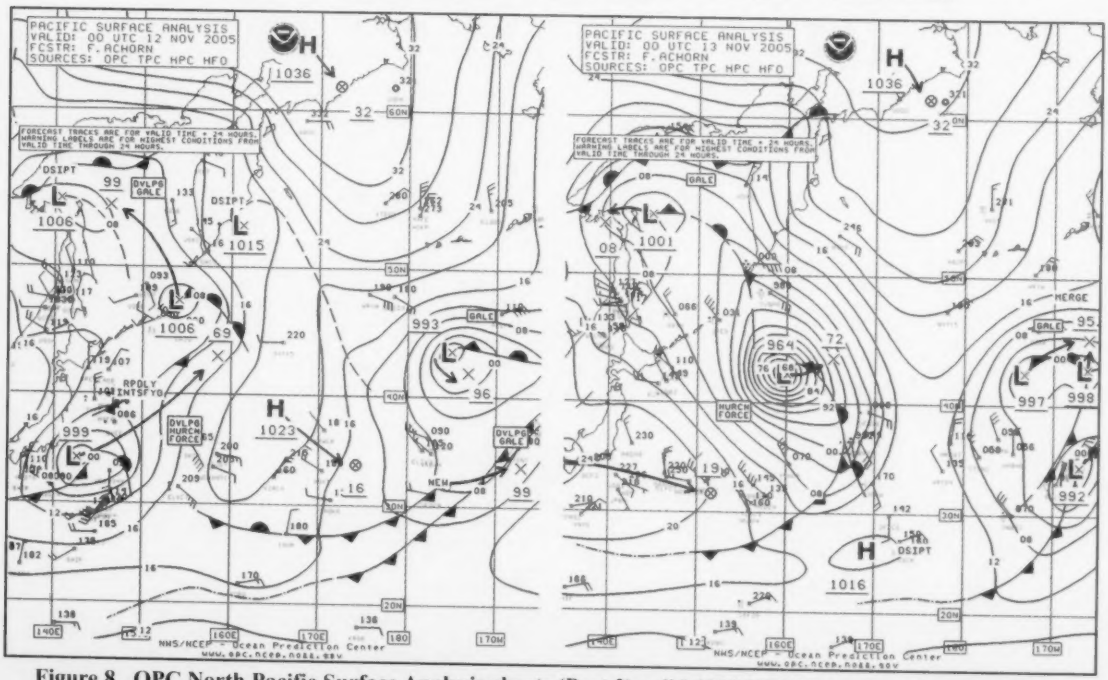


Figure 8. OPC North Pacific Surface Analysis charts (Part 2) valid 0000 UTC November 12 and 13, 2005.

taken around this storm are tabulated in ***Table 3***. The system subsequently weakened to a gale in the northern Gulf of Alaska early on the 22nd, stalled and then redeveloped southeast toward Vancouver Island late on October 24.

Western North Pacific Storm of November 11–14: ***Figure 8*** displays the rapid development of this storm over a twenty-four hour period, with the second part showing the system at maximum intensity. The central pressure fell an impressive 35 hPa during this period. Although not the most intense of the period, this cyclone was relatively compact and potent and produced perhaps the strongest winds of the period in the North Pacific.

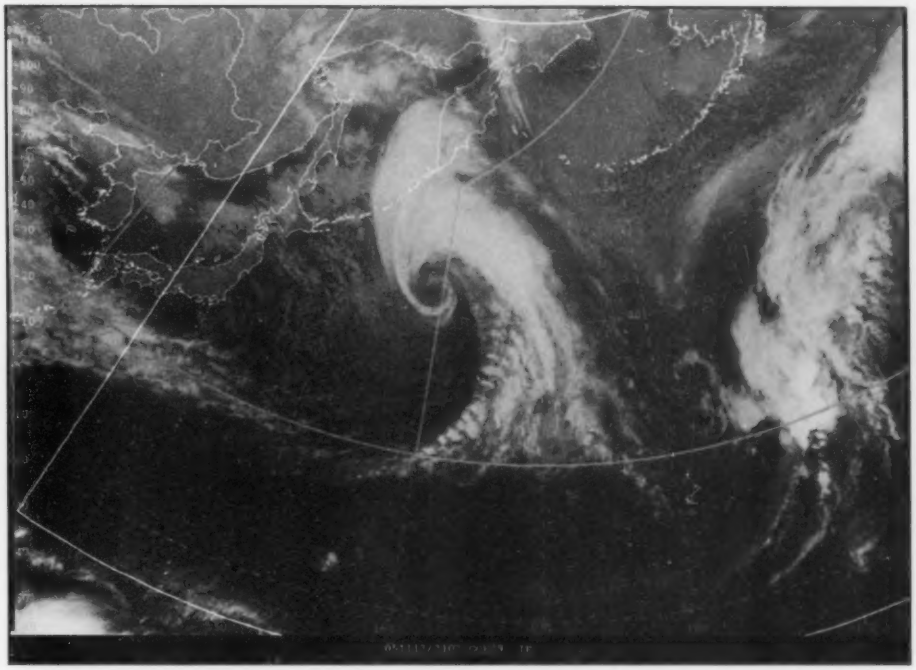
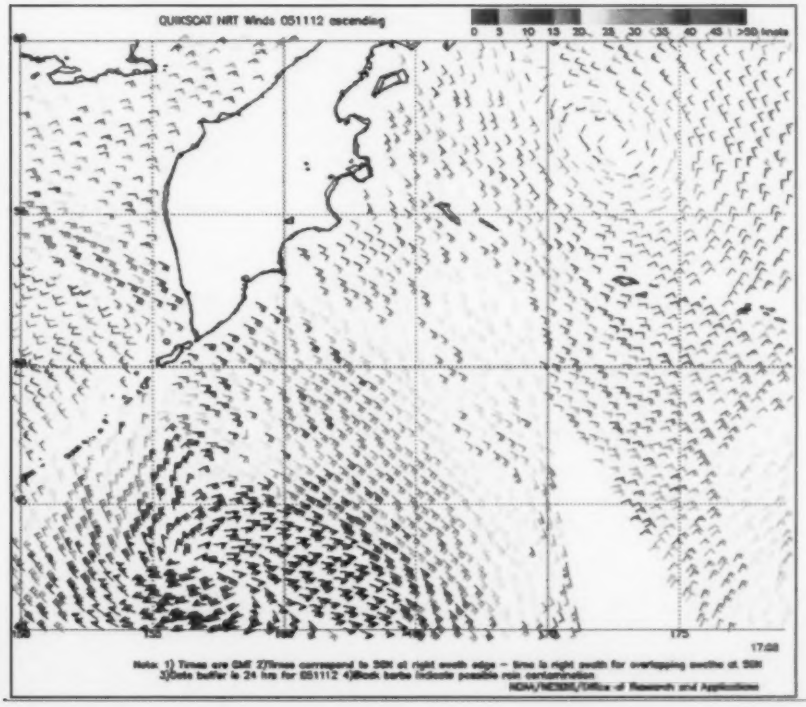


Figure 9. GOES9 infrared satellite image of the storm in *Figure 8* valid at 2102 UTC November 12, 2005. Satellite senses temperature on a scale from black (warm) to white (cold) in this type of image. The storm was near its maximum intensity at this time, with the time of the image only about three hours prior to the valid time of the second part of *Figure 8*.



The QuikScat image in ***Figure 10*** reveals winds to 85 kts on the south side of the storm and perhaps even a 90 kts barb near 40.5N 157.5E. The infrared satellite image in ***Figure 9*** taken three hours before the time of maximum intensity shows an intense comma-like cloud pattern with cold (high) tops and high-topped clouds wrapping around a well-defined center. The **CSX Spirit** (WFLG) reported an east wind of 60 kts and 9.5 m seas (31 ft) near 47N 165E at 0600 UTC

Figure 10. QuikScat scatterometer image of satellite-sensed winds around the storm shown in the second part of *Figure 8*. The valid time of the pass is 1842 UTC November 12, 2005, or about five hours prior to the valid time of the second part of *Figure 8*. The resolution is 25 km.

Image is courtesy of NOAA/NESDIS/ Office of Research and Applications.

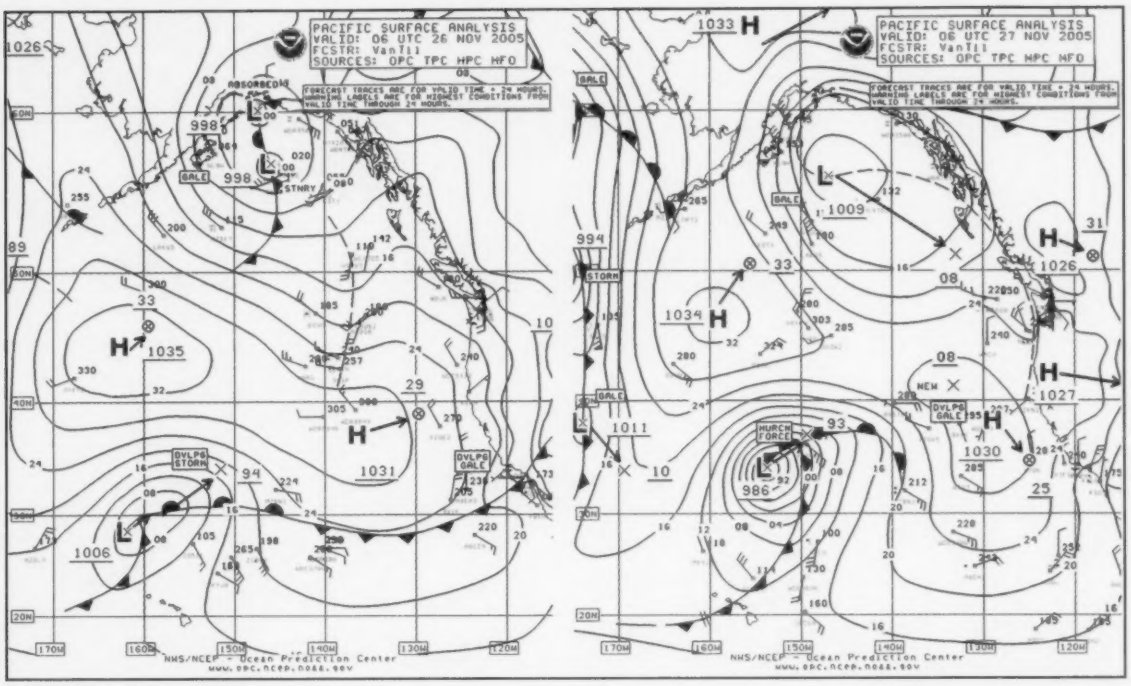


Figure 11. (above) OPC North Pacific Surface Analysis charts (Part 1) valid 0600 UTC November 26 and 27, 2005.

November 13. Blocked by high pressure to the northeast, the storm drifted east-southeast and weakened, with the center elongating eastward and then dissipating south of the eastern Aleutians on the 16th.

Central/Eastern North Pacific Storm, November 17–18: This storm originated over the southern waters near the dateline late on November 16 and tracked north while rapidly intensifying. The central pressure lowered 38 hPa in the twenty-four hour period ending at 0600 UTC on the 18th, when the center was most intense at 958 hPa, near 50N 159W. OPC briefly classified this system as a hurricane force low at 0600 UTC on the 18th. QuikScat winds available close to this time revealed winds to 70 kts, like in the October 21 storm in this part of the Pacific, except these winds

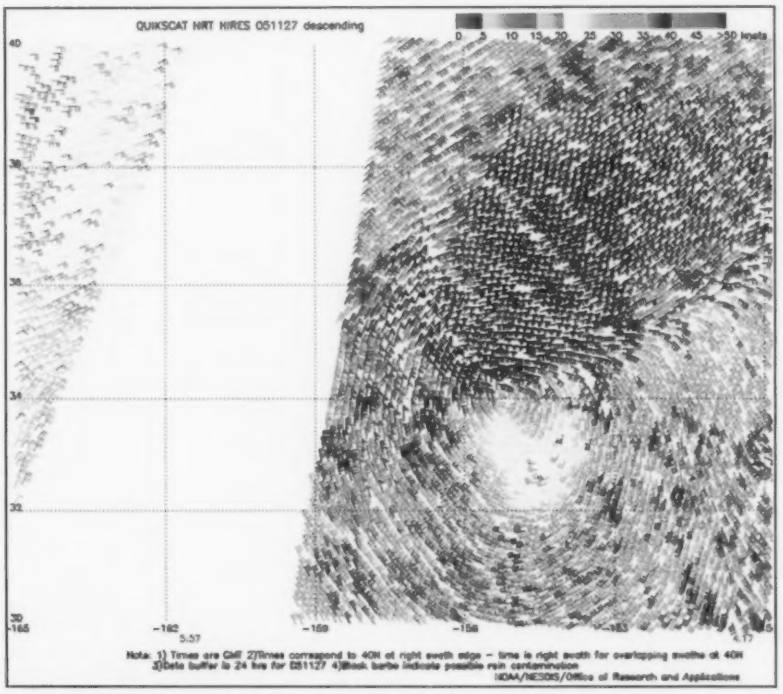


Figure 12. High-resolution QuikScat scatterometer image of satellite-sensed winds around the storm shown in the second part of *Figure 11*. The valid time of the pass is 0417 UTC November 27, 2005, or less than two hours prior to the valid time of the second part of *Figure 11*.

Image is courtesy of NOAA/NESDIS/ Office of Research and Applications.

were southwest, on the southeast side of the storm center. The strongest wind reported by a ship was north 50 kts from **APL Kennedy** (9VAY4) (54N 162W) at 1200 UTC on the 18th. The buoy 46537 (49.8N 158.1W) reported a lowest pressure of 954.9 at 0750 UTC November 18. Buoy 46634 (47.8N 162.3W) reported north winds of 56 kts at 0017 UTC on the 18th. To the north, Buoy 46001 (56.3N 148.2W) reported south winds of 39 kts with gusts to 52 kts and 9.5 m seas (31 ft) at 2300 UTC November 18. Seas were as high as 12 m (39 ft) at this buoy three hours later. The storm center subsequently lifted north-northeast into mainland Alaska and weakened early on the 19th.

Southern Cutoff Storm, November 26–29: This system originated as a frontal wave northwest of Hawaii late on November 25 and moved into OPC's southern high seas waters on the 26th, while slowing and rapidly intensifying. ***Figure 11*** shows this development, which appeared to have support aloft in the form of a 500 hPa trough that amplified and formed a closed low. See ***Reference 3*** for more information on use of the 500 hPa chart. The 20 hPa drop in central pressure in the twenty-four hour period ending at 0600 UTC on the 27th is impressive for development this far south. ***Figure 12*** shows high-resolution QuikScat data near the time of the second part of ***Figure 11***, supporting the hurricane-force label. Unlike most other lows farther north, the highest winds, up to 70 kts, are on the north side of this low where there is high pressure. The strongest wind reported by a ship was a northeast wind of 60 kts from **APL Malaysia** (A8CB4) near 37N 155W at 1800 UTC November 27. After stalling on the 27th, the cyclone drifted west on the 28th, weakened on the 29th and then re-formed to the northeast as a gale moving toward the U.S. Pacific Northwest.

Eastern North Pacific Storm, December 8–9: The first hurricane-force storm of a very active December was a marginal event, with a low deepening to 970 hPa early on the 9th after originating in the southern waters near the dateline late on the 7th. The low was briefly classified as hurricane-force from 0600 to 1200 UTC on the 9th, before the system weakened to a gale in the Gulf of Alaska later that day. The ship **Mahimahi** (WHRN) (45N 155W) reported southwest winds of 45 kts at 0600 UTC December 9.

North Pacific Storms, December 12–15: For the second time during the four-month period, two hurricane-force lows appeared simultaneously. The two formed as secondary lows south of a large complex storm southeast of the Kamchatka Peninsula on the 12th. ***Figure 13*** valid 0000 UTC December 14 shows the two hurricane-force lows, one following the other, tracking eastward then more northeast across the Pacific. The most noteworthy ship and buoy reports were from the eastern low. The ship **APL Singapore** (WCX8812) (45N 164W) encountered west winds of 55

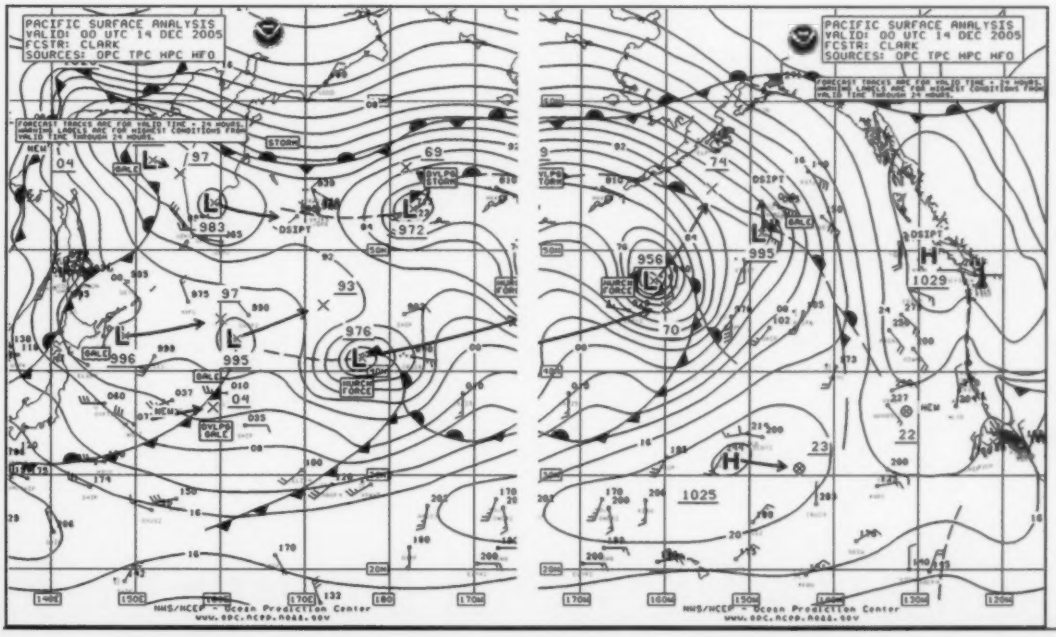


Figure 13. OPC North Pacific Surface Analysis charts (Parts 1 and 2) valid 0000 UTC December 14, 2005. This is another depiction of two hurricane-force storms occurring simultaneously, near maximum intensity.

kts and 10.7 m seas (35 ft) at 0000 UTC on the 14th. Twelve hours later the ship **Sea-Land Developer** (V7HZ7) (50.5N 155.5W) encountered southwest winds of 60 kts and 12.2 m seas (40 ft). Buoy 46633 (47.1N 165.7W) reported northeast winds of 60 kts at 1700 UTC on the 13th. Ship **Westwood Victoria** (C6SI6) reported north winds of 50 kts near 42N 171W at 1800 UTC on the 14th, with the western storm. ***Figure 14*** displays high-resolution QuikScat scatterometer winds around the stronger eastern storm, including wind barbs of at least 75 kts on the south and southwest sides of the storm center. The eastern low subsequently weakened to below hurricane force six hours later, with the western low maintaining hurricane-force winds until 0000 UTC on the 15th. The eastern low turned northwest into the Bering Sea on the 15th, where it dissipated, while the other low moved into southwest Alaska early on the 16th as a gale.

Southeastern North Pacific Storm, December 18–20: This storm developed rapidly in the southeastern high seas waters, aided by a strong southern jet stream. ***Figure 15*** shows this development. Some impressive ship reports are listed in ***Table 5***. The system subsequently turned north and attained a lowest central pressure of 960 hPa near 46N 139W at 1200 UTC on the 20th. Weakening followed, with the low dissipating near the southern Alaska coast December 22.

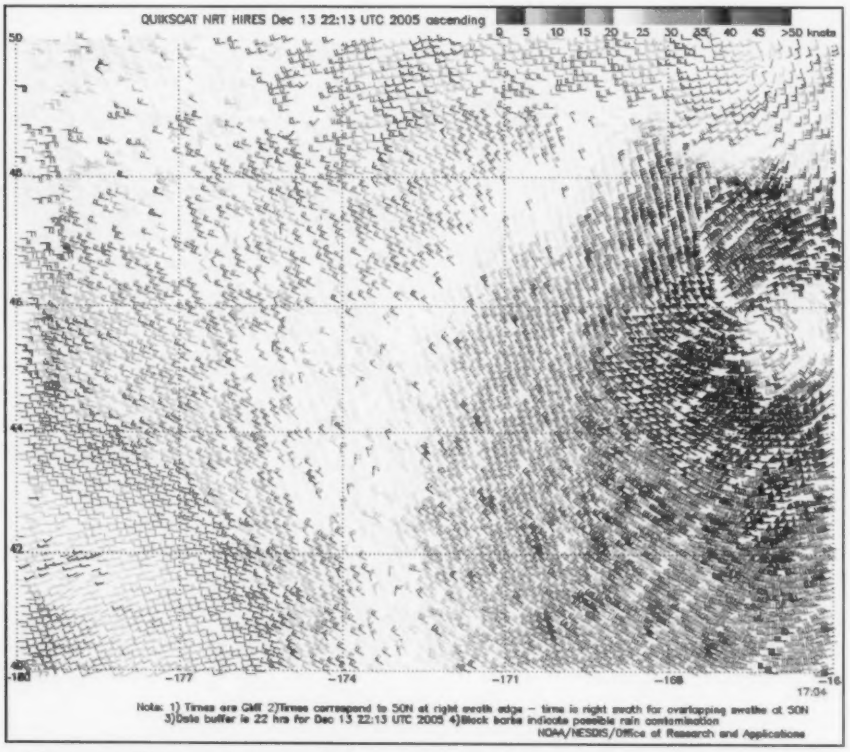


Figure 14. High-resolution QuikScat scatterometer image of satellite-sensed winds around the eastern storm shown in the second part of *Figure 13*. The valid time of the pass is 1704 UTC December 13, 2005, or about seven hours prior to the valid time of the second part of *Figure 13*.

Image is courtesy of NOAA/NESDIS/ Office of Research and Applications.

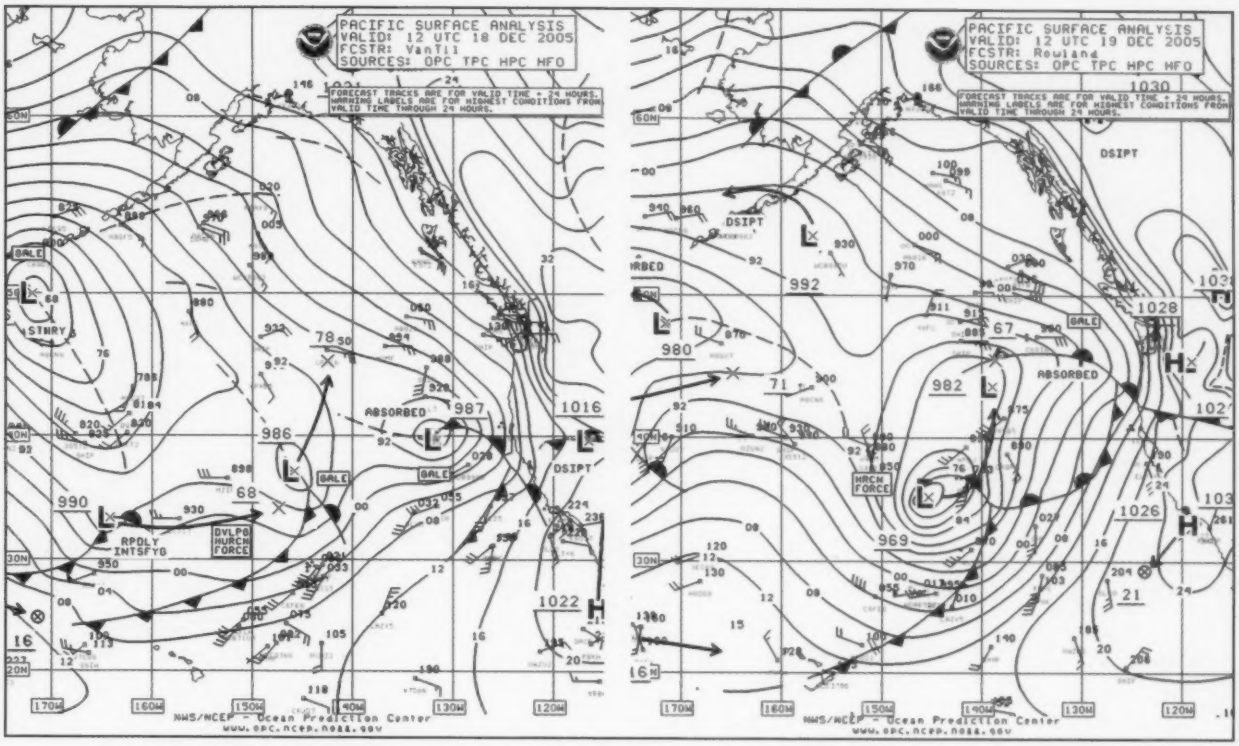


Figure 15. OPC North Pacific Surface Analysis charts (Part 1) valid 1200 UTC December 18 and 19, 2005.

OBSERVATION	POSITION	DATE/TIME(UTC)	WIND(kt)	SEAS(m/ft)
Patmos Senator (ELTZ7)	31N 150W	19/0500	W 55	
	31.5N 150W	19/0800	NW 70	
	31N 149W	19/1100	W 60	12.2/40
	31N 148W	19/1400	W 65	7.0/23
Lurline (WLVD)	30.4N 142W	19/1800	W 45	12.2/40
Greenwich Maersk (MZIF7)	36N 135.5W	20/0000	SW 55	9.5/31
Dirch Maersk (OXQP2)	38N 133W	20/0000	S 40	11.3/37
Zim Texas (ELTY6)	47N 126W	20/1800	S 40	9.0/30

Table 3. Selected ship observations taken in the storm of December 18-20.

Western North Pacific Storms of December 21–26: The development of this cyclone is depicted in **Figure 16** which covers a thirty-six hour period of initial rapid intensification. The central pressure lowered by 39 hPa in the twenty-four hour period ending at 1200 UTC on the 22nd. The storm maintained hurricane-force winds for a relatively long period, from 1200 UTC on the 22nd to 0600 UTC on the 24th. The strongest wind reported by a ship was west 55 kts from **CSAV Ningbo** (ELWP5) (32N 144E) at 1200 UTC December 22. The vessel **OOCL Long Beach** (VRY04) (37N 159E) reported west winds of 50 kts and 10.1 m seas (33 ft) at 0600 UTC on the 23rd. Another vessel, SHIP (53N 169E) encountered northeast winds of 45 kts and 11.3 m seas (37 ft). QuikScat scatterometer winds were available (not shown) from 1953 UTC December 22 and show a pattern similar to that shown with the October 21 storm (***Figure 7***) with highest wind on the southwest side, up to 75 kts. The storm deepened further to 945 hPa (50N 176E) at 0000 UTC December 24 before turning east along 50N and weakening, making it the deepest of the period in the North Pacific. Another weaker system followed this, passing east of northern Japan on the 25th and briefly developing hurricane-force winds near the southern Kurile Islands early on the 26th before stalling and then turning east on the 28th with a weakening trend.

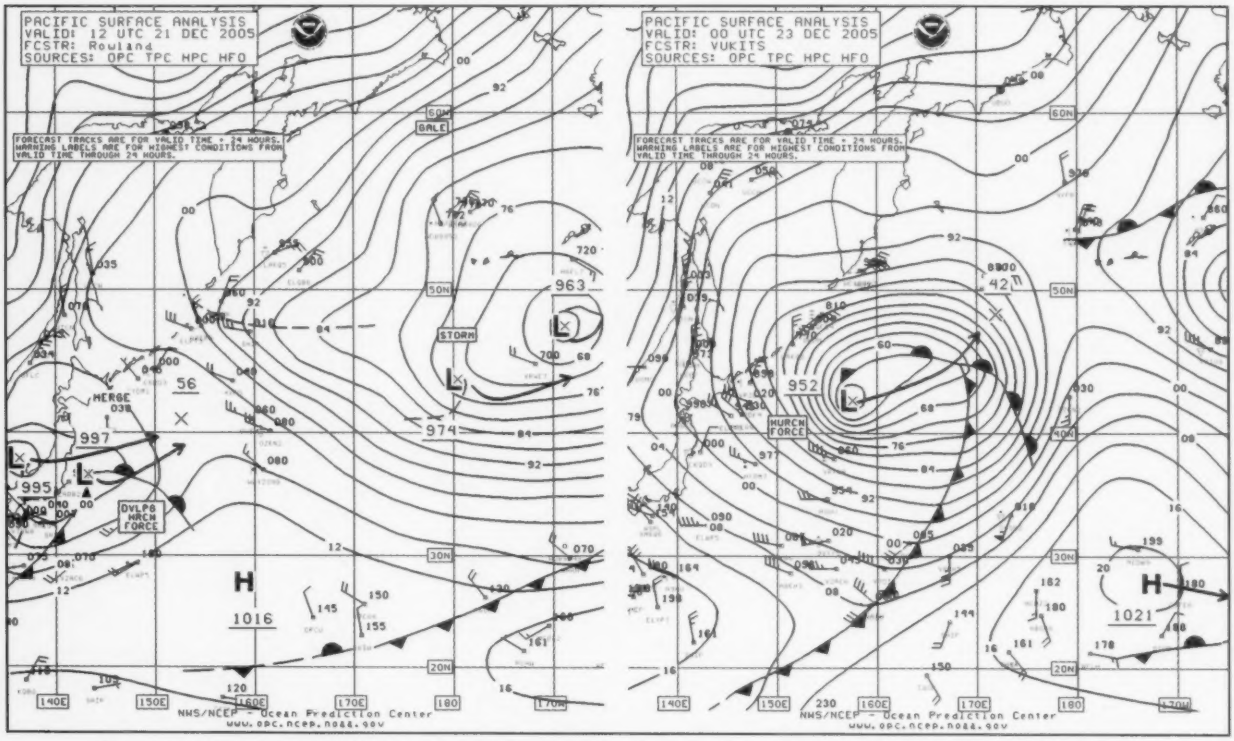


Figure 16. OPC North Pacific Surface Analysis charts (Part 2) valid 1200 UTC December 21 and 0000 UTC December 23, 2005.

References

1. From Tropical Prediction Center website, http://www.nhc.noaa.gov/aboutsshs.shtml.

2. From Tropical Prediction Center website, http://www.nhc.noaa.gov/archive/2005.

3 Sienkiewicz, J. and Chesneau, L., Mariner's Guide to the 500-Mb Chart (Mariners Weather Log, Winter 1995).

Tropical Atlantic and Tropical East Pacific Areas September through December 2005

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Introduction

The September through December time period begins during the peak of the record setting 2005 Atlantic hurricane season. Therefore, the vast majority of the significant weather events of the period were active tropical cyclones that occurred across both the Atlantic and East Pacific basins. In the Atlantic, 15 of the record setting 27 named storms formed after 1 September, including 10 hurricanes. In the eastern Pacific, 6 of the 15 named storms formed after 1 September. During the period, gale warnings were issued in the TPC's Tropical Analysis and Forecast Branch (TAFB) Atlantic high seas forecasts on the incipient weather systems that became tropical storms Tammy, Gamma, Delta, and Zeta. (Due to the hyperactive hurricane season, the annual summary of the Atlantic and eastern Pacific hurricane seasons is not included in this edition of Mariner's Weather Log. It is expected to be published in the next edition.) Also as a result of the active hurricane season, TAFB's 2005 Atlantic High Seas Forecasts contained warnings 46% of the time. This was 15% higher than in 2004.

Atlantic

The first non-tropical gale warning of the fall and winter season did not occur until 14 November. Typically, the non-tropical gale season begins in the Gulf of Mexico and subtropical Atlantic in mid-to-late October. Between mid-November and the end of the December a few cold fronts produced gales in the Gulf of Mexico and the western Atlantic. A brief period of gales also occurred in the southern Caribbean along the coast of Colombia in mid-December.

The most significant non-tropical event of the period brought storm force winds to the southwestern Gulf of Mexico between 16–18 November. This event began when a strong cold front moved off the Texas coast just before 0000 UTC 16 November. Behind the front, strong high pressure built southward. At 0000 UTC, a 1040 hPa (mb) high was analyzed over Idaho. The high covered the entire central and western United States. At 0600 UTC, the main high center remained over the northwestern United States, while a second 1034 hPA (mb) high was analyzed over northwest Texas. As this high built southward, it created a strong pressure gradient immediately behind the front over the Gulf of Mexico. Winds at NOAA buoy 42002 (25.2N 94.4W) quickly increased behind the front. Sustained winds at the buoy stayed just below gale force and peaked at 32 kts with gusts to 39 kts. Stronger winds occurred along the coast of Mexico, where the northerly winds funneled down the eastern slopes of the Sierra Madre Mountains. A QuikSCAT pass around 1200 UTC 16 November (***Figure 1***) detected 40-50 kts winds along the coast of Mexico. At some of the land based observing sites along the Mexican coast, 35 to 40 kts sustained winds were reported. At 1200 UTC 17 November, the 1035 hPa (mb) high was centered over eastern Texas. At this time, gale to storm force winds continued over the southwestern Gulf of Mexico. The front exited the southeast Gulf of Mexico early on the 18th. At this time, the high moved northeastward and weakened with gale force winds ending over the area. This event also produced storm force winds on the Pacific Ocean side of Mexico in the Gulf of Tehuantepec.

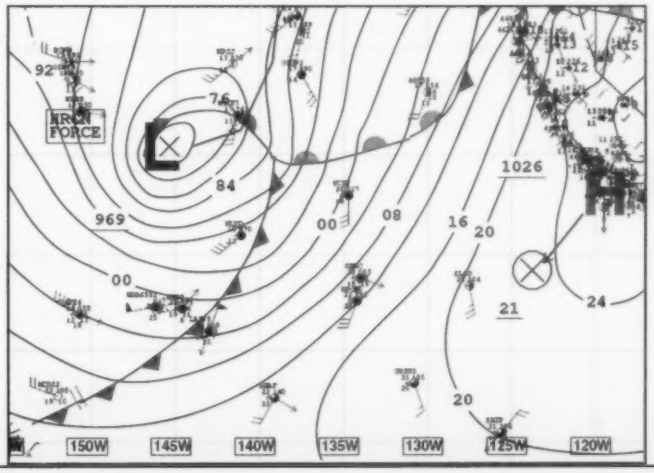


Figure 1. **QuikSCAT data from around 1200 UTC 16 November, 2005.** *Image Courtesy of National Environmental Satellite, Data, and Information Service*

Eastern Pacific

The first Gulf of Tehuantepec gale event of the season began in early November. Once the "Tehuantepec season" began, the events occurred quite regularly from mid-November to late December. A total of six Gulf of Tehuantepec gale events occurred during the period. Storm force winds were observed during the event that occurred between 17 and 19 November. ***Table 1*** is a list of the estimated beginning and ending times of Gulf of Tehuantepec gale and storm events during the period. These events were verified by either a reliable ship observation or timely QuikSCAT data.

The most significant non-Tehuantepec event of the period occurred between 18 and 20 December. During this event, two very strong lows produced an extended period of gale force winds. The first low, 986 hPa (mb), moved east-northeastward near the northwestern portion of the TAFB high seas area (from the equator to 30N, east of 140W to the coast of Mexico and Central America). This low produced an area of 30-40 kts southwesterly winds on the 18th. A second, much stronger low centered about 1200 nmi north-northeast of the Hawaiian Islands at 0000 UTC 19 December moved east-northeastward and rapidly deepened. This low was unusually strong for such low latitudes in the northeastern Pacific Ocean. By 1200 UTC, the 969 hPa (mb) low was centered near 36N 146W, about 350 nmi northwest of the TAFB high seas forecast area. Around 1200 UTC (***Figure 2***), the trailing cold front crossed 140W south of 30N. Immediately ahead of the front, winds increased to storm force. At 1800 UTC the ship, **Nikkei Tiger** (3FMH7), observed 55 kts winds near 28N 137W. Another ship, the **Greenwich Maersk** (MZIF7) also reported 55 kts winds near 32N 136W at 0000 UTC 20 December. Seas built to 8.5 to 12 m (28 to 40 ft) near 30N 140W (the northwestern corner of TAFB's area of responsibility). Later on the 20th, the low turned north-northeastward and moved northward away from the area. Winds decreased below storm force south of 30N by 0600 UTC and dropped below gale force by 1800 UTC.

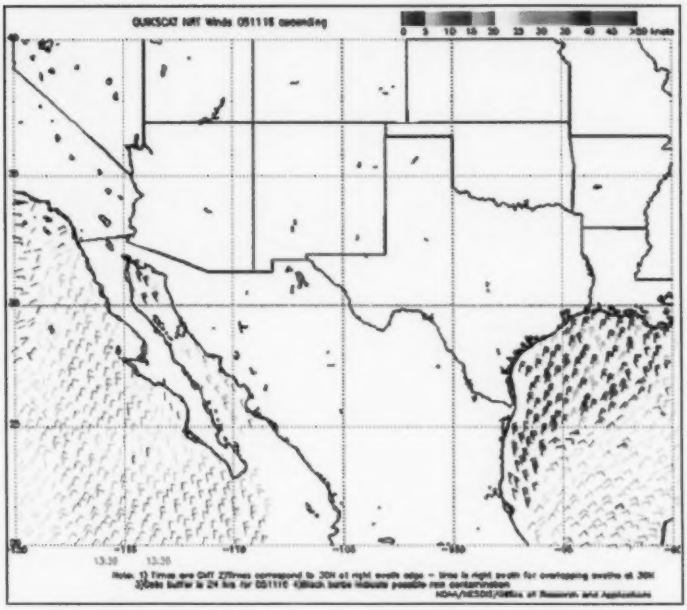


Figure 2. National Weather Service Unified Surface Map Analysis at 1200 UTC 19 December. Solid lines are isobars at 4-hPa (mb) interval. Note, the TAFB northeast Pacific high seas forecast area extends from the equator to 30N, east of 140W to the coast of Mexico and Central America.

Gulf of Tehuantepec Gale and Storm Events September-December, 2005		
Event	Beginning	Ending
1	1200 UTC 1 November	1800 UTC 3 November
2*	0000 UTC 17 November	0600 UTC 20 November
3	0600 UTC 21 November	1200 UTC 23 November
4	0600 UTC 9 December	0000 UTC 11 December
5	0000 UTC 12 December	1800 UTC 12 December
6	0000 UTC 19 December	0600 UTC 23 December

Table 1. Estimated beginning and ending times for Gulf of Tehuantepec gale and storm events from September through December, 2005. Storm event is denoted with an asterisk (*).

Mean Circulation Highlights and Climate Anomalies September through December 2005

A. James Wagner, Senior Forecaster, Climate Operations Branch, Climate Prediction Center /NCEP/NWS/NOAA.

The circulation pattern over the Northern Hemisphere during September and October was characterized by generally lower than normal 500 mb heights and sea level pressures at high latitudes, especially over northern Russia, the extreme northern Pacific, Alaska and the adjacent Arctic Ocean. Middle tropospheric heights were above normal over most of the eastern half of North America throughout most of the two-month period. An unusually large area of somewhat below normal SLP extending from the western Caribbean Sea and eastern Gulf of Mexico northeastward along the south Atlantic Coast and adjacent Atlantic Ocean reflects the tracks of many tropical and extratropical systems that gave rather wet weather to much of the eastern Seaboard during October. Lack of a corresponding reflection in the slightly above normal middle tropospheric heights shows the predominance of warmer than normal tropical air masses in this area. Over Europe, both middle tropospheric heights and SLP were well above normal, reflecting strongly anomalous anticyclonic conditions shifted across northern Europe. Over both oceans, stronger than normal westerlies at high latitudes and generally weaker than normal westerlies or stronger than normal easterlies at subtropical latitudes depicted the persistence of a pattern more typical of summer far into the fall season.

The generally above normal heights over eastern North America during September were associated with above normal temperatures and a continuation of summer-like conditions when tropical air masses continued their dominance. During October the average SLP showed that an anomalous westward extension of the Bermuda High was replaced by a break in the ridge that reflected the passage of numerous storms, both tropical and extratropical. The precipitation pattern responded to conditions in the lower atmosphere, as dry conditions that had prevailed over the Northeast in September were followed by a record wet October in some locations, with flooding in parts of New England. Temperatures were generally above normal over Alaska during both months, and most of the State was very wet in September with a strong southwesterly flow off the Bering Sea, where ridge conditions during most of the summer had built up anomalously warm sea surface temperatures. Generally drier than normal weather prevailed over eastern portions of the southern Great Plains and lower Mississippi Valley, continuing to intensify an area of drought that developed earlier in the year. Over the Pacific Northwest, long-term drought persisted through September but timely early fall rains moved into the area during October in response to a deepening trough just off the coast of British Columbia that shows noticeably on the two-month mean circulation patterns both at the surface and in the middle troposphere.

The Tropics

Conditions over the equatorial Pacific remained in a neutral ENSO state, but drifted slowly in the direction of a weak La Nina. This, along with the currently active phase of the interdecadal cycle of tropical storm activity that began in 1995, extensive areas of well above normal SSTs in the Atlantic-Caribbean Basin, and less than normal shear between winds in the lower and upper troposphere over the tropical Atlantic, all contributed to what was already a record number of named tropical storms, exhausting the available English names and requiring use of the Greek Alphabet by the end of October.

November-December 2005

During these late fall and early winter months, unusually fast zonal westerlies prevailed across the western and central Pacific at middle latitudes to the south of a large area of below normal 500 mb heights. By December, however, practically the entire northern Pacific Ocean was covered by below normal middle tropospheric heights and sea level pressures, with frequent vigorous, rapidly moving storms crossing the entire ocean basin. These storms were in part fueled by very cold air moving south-

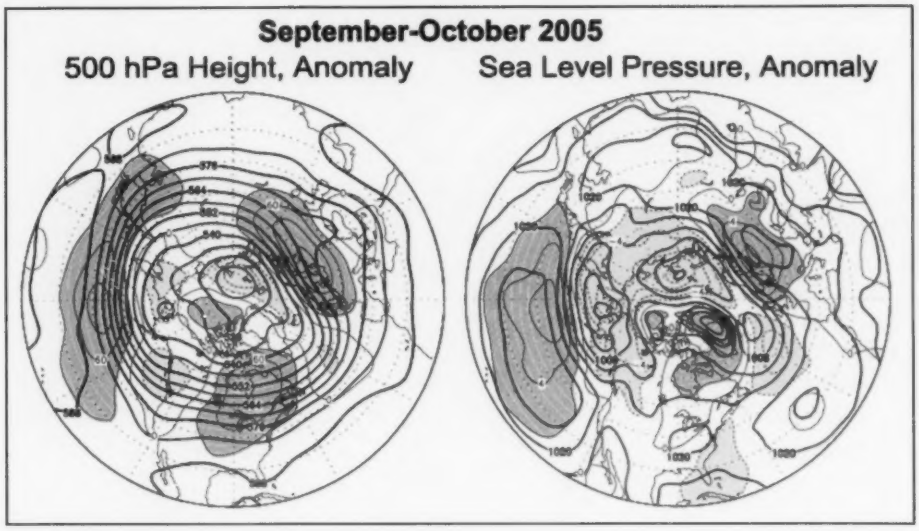
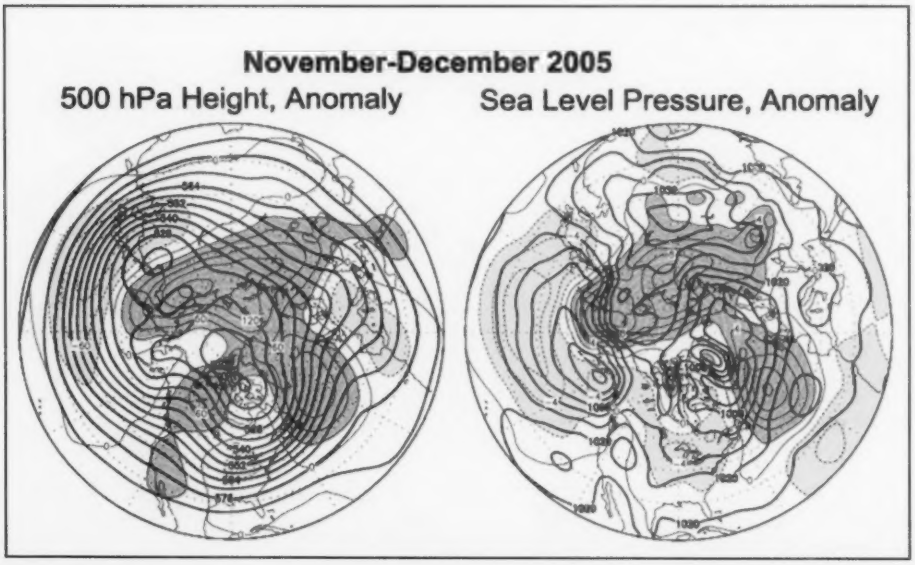


Figure legends and description of units:
The charts on the left shows the seasonal mean 500 hPa height contours at 60 m intervals in heavy solid lines, with alternate contours labeled in decameters (dm). Positive height anomalies are contoured in light solid lines at 30 m intervals, and light dashed lines show negative height anomalies. Areas of mean height anomalies more than 30 m above normal have heavy shading, and areas of mean height anomalies more than 30 m below normal have light shading.
The charts on the right show the seasonal mean sea level pressure (SLP) at 4 hPa intervals in heavy solid lines, labeled in mb at selected intervals. Anomalies of SLP are contoured in light lines at 2 hPa intervals, with dark shading and solid lines in areas more than 2 hPa above normal, and light shading with dashed lines in areas greater than 2 hPa below normal.



ward out of Siberia. In fact, the Arctic Oscillation became strongly negative during December, with well above normal heights and SLP dominating high latitudes in all sectors of the Northern Hemisphere, especially the Asian side. The two-month average again obscures important differences in the two months. In November, the high-latitude blocking was strongest over eastern Siberia, while in December blocking was centered over central Asia. Temperatures were unusually cold over Alaska during November under the influence of a trough east of the Siberian ridge, but in December milder conditions developed due to influences of maritime air from the active storms tracking across the Pacific and often ending in the Gulf of Alaska, as shown by the deeper than normal eastward-displaced Aleutian Low.

A trough prevailed over eastern North America during this period, but November temperatures averaged above normal over most of the country, when the trough was relatively weak and there was little cold air in Canada for it to bring southward into the U.S. The December pattern, however, with a strong trough over the eastern U.S. and above normal middle tropospheric heights over northern Canada favoring the formation of significant Arctic air masses at the surface, which were steered southeastward into the central and eastern U.S., dominates pattern the two-month mean map, showing an early start to winter over much of the eastern half of the country. Although not reflected in the two-month mean map, many of the vigorous Pacific storms continued on into the U.S., especially during December, causing gales and floods in coastal areas and bringing wet conditions well inland, removing the last vestiges of the long multi-year drought that had plagued interior sections of the Western States. To the east, much of the storm activity shifted from the Great Lakes area in November to the Atlantic Coast in December, and a number of early season snowstorms were observed. With northerly anomalous flow aloft and westerly anomalous flow at the surface, most of the precipitation missed the southern Great Plains and western Gulf area, which continued to suffer from an unusual intensifying winter drought that had begun to develop during the warmer part of the year.

Over the eastern part of the Atlantic Basin, the subtropical ridge was unusually strong and displaced north of its normal position, and higher than normal middle tropospheric heights and sea level pressures prevailed during most of this two-month period. Storms, may of them tropical or subtropical in nature, tended to stall over the eastern Atlantic at low latitudes in the vicinity of the Azores.

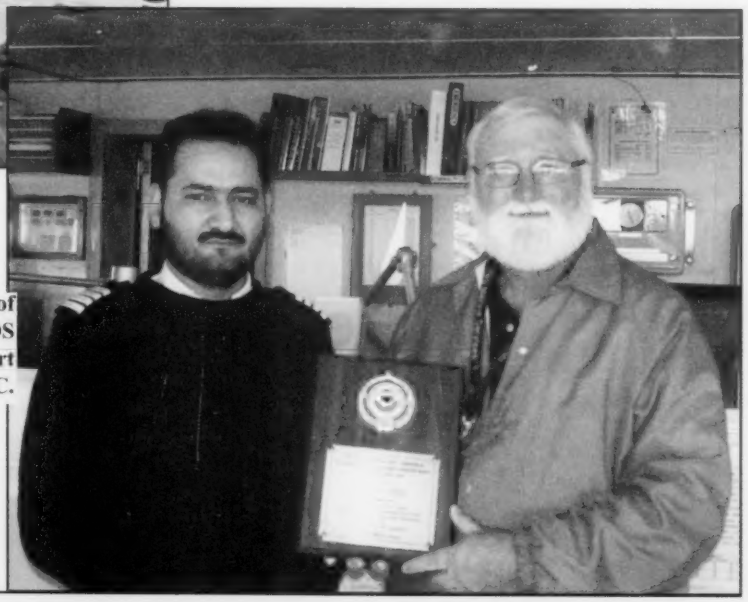
The Tropics

Conditions in the equatorial Pacific continued to move slowly towards a weak La Nina, with SSTs over the eastern and central equatorial Pacific becoming progressively colder relative to normal. By the end of the year, all of the equatorial Pacific east of the Date Line had below normal SSTs, and some of the atmospheric circulation indices were beginning to respond. However, the circulation at middle latitudes over the Pacific-North American (PNA) sector was more typical of what is often observed during El Nino, especially during December, with an abnormally deep southward-displaced Aleutian Low and a strong Pacific jet stream extending across most of the ocean. The Madden-Julian Oscillation (MJO) continued to be very inactive and for all practical purposes non-existent. Although no more hurricanes or tropical storms in the Atlantic sector had substantial effects on the U.S., during this period, several more formed during this two-month period in an area of low vertical wind shear and above normal SSTs over the eastern Atlantic. The final storm, named, culminating in Zeta, was the 27th named storm in a record-breaking season and briefly became a minimal hurricane over the eastern Atlantic and persisted into January of 2006.

VOS Program Awards

The MV *Chesapeake Bay* received a 2004 NOAA Award. Left to right: Cadet John Pagano, Second Mate Gene Morrow, REO Kenneth Ader (holding plaque), and AB Roy Johnson.

Pictured left to right receiving a VOS Award for the ferry *Kennicott* is Chief Mate Rich Preston, Captain Barry Oliver, and Mate Dave Fulton.



Captain Paramjyot Singh Sidhu (left), master of *Sea-Land Express*, was presented with a 2004 VOS award by Tim Kenefick (right), Port Meteorological Officer, Charleston, SC.

National Weather Service VOS Program New Recruits From November 1, 2005 through February 28, 2006

Name of Ship	Call	Agent Name	Recruiting PMO
BERING LEADER	WDC7227	F/V BERING LEADER C/O STERLING SERVIS	KODIAK, AK
CARNIVAL LIBERTY	HPYE	CARNIVAL CRUISE LINES	MIAMI, FL
CIELO D'AMERICA	ICCV	NORTON LILLY INTERNATIONAL	NORFOLK, VA
CONSTELLATION	C6FV2	CONTINENTAL SHIPPING INC.	MIAMI, FL
CSCL NEW YORK	VRBH7	TODD EVERHARD, RENAISSANCE SHIPPING AGENCY	NORFOLK, VA
EVER UBERTY	3FAG9		SEATTLE, WA
HATSU SIGMA	MKKZ7		SEATTLE, WA
HOEGH OCEANIA	HOXM	KERR NORTON STRACHAN	NEW YORK CITY, NY
IRENES RELIANCE	SZRT		SEATTLE, WA
LNG AQUARIUS	V7BW6	LNG AQUARIUS C/O ENERGY TRANSPORTATION CORP	ANCHORAGE, AK
MAERSK DHAKA	A8HN5	NORTON LILLY INTERNATIONAL, INC.	NORFOLK, VA
MAERSK NEUSTADT	C4AH2		SEATTLE, WA
NOORDAM	PHET	NOORDAM C/O HOLLAND AMERICA	ANCHORAGE, AK
PHILADELPHIA	KSYP	UNITED STATES SHIPPING LLC	MIAMI, FL
PICTON CASTLE	ZKWP	BARQUE PICTON CASTLE	ANCHORAGE, AK
SAFMARINE ILLOVO	A8HJ8	AHRENKIEL SHIPMANAGEMENT GMBH & CO. KG	NEW YORK CITY, NY
SEABULK NEVADA	WCY2306	SEABULK NEVADA C/O CISPRI	ANCHORAGE, AK
SEALAND INTEGRITY	WPVD		HOUSTON, TX
SHANGHAI HIGHWAY	3ECE2	K-LINE AMERICA INC., ED WHITE"	NEW YORK CITY, NY
STAR HARDANGER	9VAW6	WESTFAL-LARSEN MANAGEMENT AS	BALTIMORE, MD
UNIVERSAL SPIRIT	ELNT7		NEW YORK CITY, NY
VENICE BRIDGE	3EAU3	COSCO NEW YORK	NEW YORK CITY, NY
ZIM SHANGHAI	SVBC	ZIM-AMERICAN ISRAELI SHIPPING CO INC.	NEW YORK CITY, NY

23 More Recruits

Welcome Aboard & Thanks! — Luke

VOS Cooperative Ship Report: January through December 2005

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2ND LT JOHN P. BOBO	WJKH	Norfolk	47	60	36	0	0	0	0	0	0	0	0	0	143
ADMIRALTY WIND	WCY7687	Anchorage	0	7	5	0	0	0	0	0	0	0	0	0	12
ADVANTAGE	WPPO	Norfolk	46	25	34	15	25	7	6	28	6	0	0	0	192
ALASKA SPIRIT	WCC5414	Kodiak	0	0	0	0	0	0	0	0	0	0	1	0	1
ALASKAN EXPLORER	WDB9918	Valdez	0	0	0	16	8	11	2	1	27	31	45	39	180
ALASKAN FRONTIER	WDB7815	Valdez	0	0	0	0	0	6	51	38	0	6	30	0	131
ALASKAN LEADER	WDB7918	Kodiak	96	6	62	0	0	0	7	52	57	63	24	14	381
ALASKAN NAVIGATOR	WDC6644	Valdez	0	0	0	0	0	0	0	0	0	0	0	1	1
ALBATROSS IV	WMVF	Norfolk	45	101	105	117	119	46	121	141	142	138	126	0	1201
ALBEMARLE ISLAND	C6LU3	Miami	11	20	18	30	39	40	25	41	32	37	29	26	348
ALERT	WCZ7335	Valdez	7	1	2	6	3	4	1	13	8	29	22	24	120
ALKIN KALKAVAN	V7GY3	Norfolk	0	0	0	0	0	22	41	49	53	49	30	14	258
ALTAIR VOYAGER	C6OK	Baltimore	10	11	49	56	39	51	38	87	67	30	56	55	549
AMERICAN NO. 1	WTY8664	Kodiak	0	0	1	0	0	0	0	0	0	0	0	0	1
AMSTERDAM	PBAD	Anchorage	21	29	23	32	25	4	6	0	1	1	14	44	200
ANTARES VOYAGER	C6PZ3	San Francisco	9	19	24	42	9	5	1	0	31	34	61	44	279
APL ALEXANDRITE	9VBA	San Francisco	13	42	20	37	50	30	0	56	30	59	29	32	398
APL ALMANDINE	9VBS	Norfolk	0	0	14	3	0	0	0	0	15	19	6	0	57
APL AMAZONITE	9VBX	Los Angeles	17	54	30	60	45	46	24	31	47	21	61	40	476
APL CANADA	A8CG6	San Francisco	0	48	50	24	49	31	43	37	34	42	36	43	437
APL CHINA	WDB3161	Los Angeles	70	56	49	59	63	41	51	67	63	61	59	55	694
APL DALIAN	S6HU6	Norfolk	8	43	40	32	25	5	0	0	1	0	0	0	154
APL JAPAN	S6TS	Seattle	61	76	28	33	66	88	57	74	67	77	75	63	765
APL KENNEDY	9VAY4	Seattle	70	54	59	63	38	36	46	62	45	47	61	0	581
APL KOREA	WCX8883	Los Angeles	23	13	0	3	22	21	4	21	20	9	5	30	171
APL NEW YORK	A8GS3	New York City	0	0	0	0	0	0	0	0	37	52	46	46	181
APL PERU	V2OE2	New York City	49	28	16	64	11	48	3	16	20	16	16	27	314
APL PHILIPPINES	WCX8884	Los Angeles	8	31	48	35	19	12	28	17	29	10	7	6	250
APL SCOTLAND	9VDD3	Seattle	0	0	22	0	0	0	0	0	0	0	0	0	22
APL SINGAPORE	WCX8812	Los Angeles	46	37	0	37	49	41	46	46	28	51	69	63	513
APL SWEDEN	9VYY5	Seattle	28	33	65	53	66	35	55	18	21	21	14	9	418
APL THAILAND	WCX8882	Los Angeles	64	24	3	37	42	44	30	29	36	20	22	39	390
APL TURQUOISE	9VVY	San Francisco	19	25	14	5	19	22	31	42	27	10	37	35	286
ARAL SEA	S6CD2	Houston	0	51	49	68	65	60	30	13	13	1	0	0	350
ARCTIC BEAR	WBP3396	Kodiak	0	0	0	1	0	0	0	0	0	0	11	0	12
ARCTIC SUN	ELQB8	Anchorage	219	254	192	183	98	158	174	210	218	443	562	591	3302
ARCTIC WANDERER	WCZ8910	Kodiak	0	0	0	0	0	8	0	3	0	0	0	0	11
ARIZONA VOYAGER	KGBE	Miami	11	30	22	0	0	4	3	0	0	0	0	0	70
ARTHUR M. ANDERSON	WE4805	Chicago	0	0	2	45	51	25	48	0	12	29	40	60	312
ASPHALT COMMANDER	WFJN	New Orleans	34	5	27	0	0	1	0	60	51	29	11	21	239
ATLANTIC CARTIER	SCKB	Norfolk	34	39	40	30	35	37	43	43	39	33	43	40	456
ATLANTIC FOREST	WDB2122	New Orleans	5	0	34	26	2	10	16	0	15	12	1	12	133
ATLANTIC OCEAN	C6T2064	New York City	26	48	47	20	46	16	46	19	32	20	21	32	373
ATLANTIS	KAQP	Kodiak	0	0	6	8	9	9	0	0	0	3	0	0	35
ATTENTIVE	WCZ7337	Valdez	33	17	8	0	1	6	5	21	36	16	20	15	178
AURORA	WYM9567	Kodiak	0	0	0	0	1	0	0	0	0	0	0	0	1
AVIK	WDB7888	Anchorage	0	0	0	0	0	0	0	0	5	14	0	0	19
AWARE	WCZ7336	Valdez	18	21	14	2	6	4	3	7	15	18	19	16	143

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
BARBARA ANDRIE	WTC9407	Chicago	0	0	0	0	0	0	0	0	9	4	4	1	18
BARRINGTON ISLAND	C6QK	Miami	58	45	65	42	25	57	63	88	72	86	83	74	758
BARROW RESEARCH	KCB53	Anchorage	0	0	0	27	32	26	28	23	31	28	14	0	209
BENGAL SEA	ELPL3	New York City	0	0	0	2	0	0	48	0	30	46	0	30	156
BERNARDO QUINTANA A	C6KJ5	New Orleans	64	23	40	24	26	47	55	51	61	42	58	55	546
BESIRE KALKAVAN	V7GY4	Norfolk	0	0	20	42	31	29	37	38	33	27	7	4	268
BILLIE H.	WCY4992	Kodiak	2	0	0	0	0	0	1	1	0	0	0	0	4
BJ DISCOVERY	WCY2843	New Orleans	0	0	0	0	0	0	0	0	0	39	18	0	57
BLUEFIN	WQZ9646	Kodiak	0	9	0	0	0	0	0	0	0	0	0	0	9
BOWFIN	WSX7318	Kodiak	0	2	6	0	0	0	0	0	0	0	0	0	8
BREEZE ARROW	LAOT4	Seattle	44	10	0	45	26	39	46	37	48	29	18	65	407
BRUCE	WWU8	Anchorage	28	27	30	26	25	17	22	7	16	18	15	5	236
BUCCANEER	WYW5588	Kodiak	0	0	4	0	0	4	1	1	0	0	5	0	15
BULWARK	WBN4113	Valdez	13	7	0	6	0	1	0	0	0	0	0	0	27
BURNS HARBOR	WDB4745	Chicago	5	0	4	18	28	6	0	0	0	0	0	0	61
CAJUN EXPRESS	ELXL3	Houston	8	79	17	42	57	49	20	24	17	16	38	7	374
CAMAI	KF003	Kodiak	0	0	0	2	0	1	28	18	24	19	7	0	99
CANMAR PROM!SE	ELXZ9	Anchorage	100	39	0	0	0	0	0	0	0	0	0	0	139
CAP DOUKATO	A8EW3	Charleston	13	0	10	0	0	0	0	0	0	0	0	0	23
CAPE VINCENT	KAES	Houston	0	0	27	31	0	0	0	0	0	0	0	0	58
CAPT STEVEN L BENNETT	KAXO	New Orleans	6	7	0	0	4	5	4	0	13	7	0	0	46
CARNIVAL CONQUEST	3FPQ9	New Orleans	5	9	14	2	0	17	36	21	0	0	0	0	104
CARNIVAL DESTINY	C6FN4	Miami	7	4	6	2	1	14	8	0	0	7	0	9	58
CARNIVAL GLORY	3FPS9	Jacksonville	7	0	12	32	40	39	41	39	23	12	1	1	247
CARNIVAL HOLIDAY	C6FM6	New Orleans	2	7	5	0	0	12	4	20	3	0	0	0	53
CARNIVAL LEGEND	H3VT	Miami	0	0	0	0	0	1	0	51	49	33	8	23	165
CARNIVAL MIRACLE	H3VS	Miami	0	0	0	0	0	0	10	0	0	0	0	4	14
CARNIVAL PRIDE	H3VU	Miami	4	0	1	2	6	1	0	0	0	0	0	1	15
CARNIVAL SENSATION	C6FM8	New Orleans	31	19	25	26	29	22	17	21	1	0	0	0	191
CARNIVAL SPIRIT	3FPR9	Anchorage	0	0	0	0	0	0	13	11	3	7	10	0	44
CARNIVAL TRIUMPH	C6FN5	Miami	21	8	8	11	4	12	4	13	2	8	12	36	139
CARNIVAL VALOR	H3VR	Miami	0	10	0	12	4	23	26	23	15	17	22	40	192
CARNIVAL VICTORY	3FFL8	Miami	20	11	34	35	31	32	19	20	11	16	28	21	278
CAROLINE MAERSK	OZWA2	Seattle	0	0	0	38	7	10	0	0	24	11	0	6	96
CARSTEN MAERSK	OZYB2	Seattle	16	25	0	0	0	0	0	0	0	0	0	0	41
CASON J. CALLAWAY	WE4879	Chicago	21	0	17	56	49	50	28	22	49	21	16	4	333
CELEBRATION	H3GQ	Jacksonville	15	0	14	0	14	5	0	0	0	0	0	0	48
CELTIC SEA	C6RT	Miami	0	0	0	22	18	20	37	19	24	24	18	22	204
CENTURY	C6FU5	Miami	12	14	15	8	5	0	0	0	0	1	11	13	79
CERAM SEA	9VHB9	New Orleans	0	0	0	0	0	0	0	0	0	17	32	37	86
CHARLES ISLAND	C6JT	Miami	59	64	60	63	57	21	33	39	51	41	25	38	551
CHARLES M. BEEGHLEY	WL3108	Chicago	13	0	4	13	6	13	1	11	7	21	18	12	119
CHARLESTON	WBVY	Houston	0	5	10	8	10	1	5	10	2	0	0	0	51
CHARLOTTE MAERSK	OWLD2	Seattle	0	0	0	0	0	0	0	0	23	23	0	0	46
CHEMICAL EXPLORER	KRGC	Houston	0	1	18	7	34	10	30	33	20	1	7	0	161
CHEMICAL PIONEER	KAFO	Houston	0	0	0	0	0	0	0	0	0	0	15	12	27
CHEMICAL TRADER	KRGJ	Houston	3	12	21	11	6	5	12	17	17	0	4	7	115
CHEROKEE BRIDGE	V7FW7	New York City	0	0	0	24	67	43	42	38	23	12	37	31	317
CHESAPEAKE BAY	WMLH	Norfolk	46	51	29	22	54	30	6	23	38	28	39	43	409
CHESAPEAKE BAY BRIDGE	V7FW8	New York City	0	0	0	0	18	24	42	39	42	31	36	8	240
CLEVELAND	KGXA	Houston	48	29	16	62	47	40	12	80	50	37	42	30	493
CLIFFORD MAERSK	OYRO2	Seattle	0	15	40	0	19	0	0	24	0	1	0	3	102
COASTAL MERCHANT	WCV8696	Seattle	0	0	0	1	3	0	0	0	0	0	0	0	4

VOS Cooperative Ship Report

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
COASTAL NAVIGATOR	WCY9686	Seattle	0	5	2	0	0	0	0	2	0	2	3	0	14
COASTAL NOMAD	WTP2735	Kodiak	0	1	0	1	8	3	0	0	0	0	0	0	13
COASTAL PILOT	WBP7281	Kodiak	1	3	0	0	0	0	0	0	0	0	0	0	4
COASTAL RELIANCE	WADZ	Kodiak	47	97	66	85	70	61	0	63	61	89	38	25	702
COASTAL TRADER	WSL8560	Kodiak	0	0	0	0	0	0	0	0	0	0	1	0	1
COLD BAY RESEARCH	KCI95	Anchorage	0	0	0	0	0	1	0	0	0	0	0	1	2
COLLIER BROTHERS	WUU7551	Kodiak	2	1	0	0	0	0	0	0	0	0	0	0	3
COLORADO VOYAGER	KLHZ	San Francisco	1	2	0	0	7	5	2	0	0	0	0	0	17
COLUMBINE MAERSK	OUHC2	Seattle	0	52	0	22	17	0	21	0	29	36	0	43	220
COLUMBUS VICTORIA	P3RF8	Norfolk	21	18	19	9	21	23	20	11	18	15	0	0	175
CONDOR	PJWQ	New York City	0	0	0	36	47	53	58	42	69	2	15	30	352
CORAL SEA	C6YW	Miami	21	25	32	14	0	0	0	0	0	28	30	0	150
CORNELIA MAERSK	OWWS2	Seattle	10	0	51	0	16	34	0	38	4	7	15	0	175
CORNELIUS MAERSK	OYTN2	Seattle	0	0	0	0	0	0	0	5	0	0	0	0	5
CORWITH CRAMER	WTF3319	Kodiak	5	0	2	56	7	3	37	0	0	28	25	1	164
COURAGE	WDC6907	Baltimore	0	0	0	0	0	0	0	0	0	48	48	25	121
COURTNEY L	ZCAQ8	Baltimore	28	33	15	17	29	22	17	29	25	38	14	46	313
CP AMBASSADOR	ZCDJ4	Houston	0	0	5	0	1	0	0	0	0	0	0	0	6
CP DISCOVERER	WGXO	Houston	90	68	84	82	69	53	71	91	66	67	65	69	875
CP DYNASTY	VSXC4	Anchorage	1	2	4	16	15	0	0	17	11	17	17	7	107
CP EAGLE	VSUA7	Anchorage	17	18	13	32	58	61	90	73	74	32	9	11	488
CP EVERGLADES	ZIYE7	Houston	26	20	27	11	17	13	24	16	26	7	2	6	195
CP EXPLORER	WGLA	Houston	39	58	43	45	41	47	39	41	40	21	39	13	466
CP EXPLORER	ZCDP2	Houston	39	58	43	45	41	47	39	41	40	21	39	13	466
CP JABIRU	A8CF4	Anchorage	44	68	62	55	89	56	51	83	83	97	76	91	855
CP LIBERATOR	WGXN	Houston	178	148	130	124	127	141	124	97	116	80	63	98	1426
CP NAVIGATOR	WGMJ	Houston	77	64	89	69	93	102	108	58	153	253	197	67	1330
CP TABASCO	VSUA5	Anchorage	35	42	24	6	1	0	17	3	0	5	5	11	149
CP VOYAGER	VSXC7	Anchorage	0	0	0	0	0	0	7	35	18	31	4	0	95
CP YOSEMITE	WDC6736	Houston	0	0	0	0	0	0	0	0	1	100	86	66	253
CRAIG FOSS	WX8610	Kodiak	0	0	0	0	0	0	0	4	8	0	0	0	12
CROSS POINT	WDA3423	Kodiak	0	0	0	0	0	0	0	4	3	0	0	0	7
CSCL MELBOURNE	VRBI8	Norfolk	0	0	0	0	0	0	0	0	0	17	0	6	23
CSL CABO	D5XH	Seattle	20	16	17	14	13	7	6	11	12	11	9	8	144
CYNTHIA FAGAN	KSDF	Houston	66	40	64	35	15	18	9	35	62	3	13	8	368
DAIO ANDES	3FDN9	Anchorage	60	86	79	84	93	44	67	93	75	0	0	0	681
DAVID FOSS	WYQ8110	Kodiak	0	0	0	0	15	55	0	47	8	0	0	0	125
DAVID STARR JORDAN	WTDK	Los Angeles	62	130	3	143	105	89	49	136	195	128	192	28	1260
DEEPWATER HORIZON	V7HC9	Houston	136	129	154	96	158	187	170	125	101	208	274	65	1803
DEEPWATER MILLENNIUM	V7HD2	Houston	31	37	37	27	7	30	55	75	71	57	104	114	645
DELAWARE BAY	WMLG	Norfolk	24	21	42	39	18	13	37	33	26	13	8	9	283
DELAWARE II	KNBD	New York City	27	84	116	100	43	109	125	137	75	38	20	0	874
DELAWARE TRADER	WDB3258	Houston	0	0	0	0	38	68	50	74	50	11	12	35	338
DENALI	WSVR	Los Angeles	0	0	0	0	0	12	43	27	20	14	13	10	139
DIANE H.	WUR7250	Kodiak	0	0	0	7	4	4	34	66	64	81	0	0	260
DIRCH MAERSK	OXQP2	Los Angeles	23	28	30	23	29	18	69	41	46	77	14	17	415
DIRECT TUI	ELVZ5	Norfolk	0	0	0	0	0	0	0	413	666	701	688	645	3113
DISCOVERER DEEP SEAS	V7HC6	New Orleans	29	45	42	30	38	41	83	60	40	45	53	25	531
DISCOVERER ENTERPRISE	V7HD3	New Orleans	1	0	3	3	20	6	23	29	22	8	4	10	129
DISCOVERER SPIRIT	V7HC8	Houston	27	19	39	33	19	12	32	24	20	19	7	2	253
DISNEY MAGIC	C6PT7	Jacksonville	0	0	0	0	0	0	0	5	9	1	0	3	18
DOUBLE EAGLE	WYE6617	Kodiak	0	0	0	0	0	0	0	0	3	14	2	0	19
DREW FOSS	WYL5718	Kodiak	1	24	1	7	1	0	0	0	1	0	13	0	48

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
DUNCAN ISLAND	C6JS	Miami	53	43	61	48	53	49	15	15	18	25	31	29	440
EARL W. OGLEBAY	WZE7718	Chicago	0	0	0	0	0	0	1	25	30	67	11	8	142
ECSTASY	H3GR	Miami	12	6	11	10	12	11	24	3	1	0	0	0	90
EDGAR B. SPEER	WQZ9670	Chicago	0	0	0	0	0	4	0	0	0	0	0	0	4
EDYTH L	ZCAM4	Baltimore	0	0	0	0	0	0	0	0	30	68	37	37	172
EL MORRO	KCGH	Jacksonville	24	25	12	31	28	30	33	28	57	54	39	27	388
EL YUNQUE	WGJT	Jacksonville	44	23	35	62	65	37	33	55	61	56	32	22	525
ELATION	3FOC5	Miami	34	33	57	30	44	45	17	0	1	3	13	23	300
EMMA FOSS	WCF3931	Kodiak	0	0	0	0	7	121	93	97	101	35	0	0	454
EMPIRE STATE	KKFW	New York City	0	0	0	0	14	29	15	0	0	0	0	0	58
EMPRESS OF THE SEAS	C6SE6	Miami	7	14	0	0	0	27	0	19	7	12	14	2	102
ENDEAVOR	WAUW	New York City	33	27	32	39	37	16	22	39	47	35	32	52	411
ENDURANCE	WAUU	New York City	25	34	39	76	65	76	47	52	56	87	50	47	654
ENTERPRISE	WAUY	New York City	49	30	38	55	36	31	26	34	22	21	49	31	422
EVER DECENT	3FUO7	New York City	6	0	10	0	0	15	4	0	3	0	15	7	61
EVER DEVELOP	3FLF8	New York City	0	0	0	0	0	9	0	2	3	0	2	1	17
EVER DIADEM	3FOF8	New York City	9	2	0	3	0	0	0	1	0	0	0	1	16
EVER DIVINE	3FSA8	Norfolk	11	5	2	10	7	2	4	3	8	5	7	2	66
EVER DYNAMIC	3FUB8	New York City	3	0	0	6	9	2	7	11	5	9	0	0	52
EVER DYNAMIC	3FUB8	Seattle	3	0	0	6	9	2	7	11	5	9	0	0	52
EVER GRADE	3FOW2	Seattle	16	12	14	9	13	11	10	11	12	13	13	0	134
EVER RACER	3FJL4	New York City	0	7	0	0	7	7	0	4	0	0	0	0	25
EVER REACH	3FQO4	New York City	17	16	18	15	17	4	0	8	19	10	14	11	149
EVER REFINE	3FSB4	New York City	11	17	6	0	0	0	0	0	12	0	0	0	46
EVER RENOWN	3FFR4	Los Angeles	0	0	0	0	0	0	0	15	16	15	17	10	73
EVER UBERTY	3FAG9	Seattle	0	0	0	0	0	0	0	0	1	0	0	0	1
EVER UNIFIC	3FGB9	Anchorage	3	0	1	1	0	1	0	0	0	0	0	0	6
EVER UNISON	3FTL6	Seattle	0	1	0	0	0	0	0	0	0	0	0	0	1
EVER URANUS	3FCA9	Seattle	0	0	0	0	0	0	0	0	0	3	0	0	3
EVER URSULA	3FCB9	Seattle	0	0	0	0	1	0	0	8	0	0	0	0	9
EVER USEFUL	3FCC9	Anchorage	0	0	0	0	3	2	0	5	2	0	5	0	17
EVER UTILE	3FZA9	Seattle	0	0	0	0	0	13	0	2	0	0	0	0	15
EXPLORER OF THE SEAS	ELWX5	Miami	309	199	270	461	427	424	470	231	0	0	373	245	3409
GALAXY	C6FU6	Miami	11	10	12	13	10	0	0	0	0	0	1	0	57
GALE WIND	WAZ9548	Anchorage	11	9	9	21	15	18	6	9	18	11	10	0	137
GEMINI VOYAGER	C6FE5	Los Angeles	24	10	10	14	7	33	48	60	28	39	42	12	327
GENE DUNLAP	WAS2433	Kodiak	0	0	0	0	0	0	0	0	1	2	0	0	3
GEYSIR	WCZ5528	Norfolk	76	69	73	64	41	67	52	63	61	68	74	51	759
GLADIATOR	WCZ9000	Kodiak	0	0	0	0	1	3	13	0	0	0	0	0	17
GLOIRE	3FPA6	Seattle	74	62	63	4	78	85	16	86	43	67	42	36	656
GOLDEN BEAR	NMRY	San Francisco	0	0	0	0	56	45	65	67	0	0	0	0	233
GORDON GUNTER	WTEO	New Orleans	82	90	59	69	169	122	188	109	0	108	71	0	1067
GREAT LAND	WFDP	Seattle	39	42	27	11	20	27	40	36	28	35	40	42	387
GREAT PACIFIC	WBD7567	Kodiak	0	0	0	0	0	0	0	3	0	0	0	0	3
GREEN DALE	WCZ5238	Jacksonville	13	2	27	29	14	37	33	35	15	0	9	36	250
GREEN LAKE	WDDI	Baltimore	41	41	43	22	13	34	65	57	72	48	35	37	508
GREEN POINT	WCY4148	New York City	46	29	42	29	60	22	32	30	18	0	0	0	308
GREENWICH MAERSK	MZIF7	New York City	0	32	39	31	34	15	0	43	51	58	38	34	375
GRETA	WCY2853	Kodiak	0	0	0	0	16	0	13	47	18	33	43	3	173
GROTON	KMJL	New York City	14	44	57	26	35	18	12	20	10	3	9	16	264
GSF DEVELOPMENT DRILLER 1	YJSW5	Houston	0	0	0	0	25	12	12	3	0	0	0	0	52
GSF EXPLORER	WCX5333	New Orleans	59	26	18	87	13	7	1	0	0	0	0	0	211

VOS Cooperative Ship Report

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
GUARDIAN	WBO2511	Anchorage	0	0	0	0	0	0	0	0	1	0	0	0	1
GUARDSMAN	WBN5978	Anchorage	0	0	0	0	37	64	38	21	46	14	0	55	275
GULF TITAN	WDA5598	Anchorage	4	18	17	7	3	2	4	7	6	15	9	10	102
GYR FALCON	WCU6587	Kodiak	0	0	0	0	0	0	0	0	0	0	1	0	1
HALLE FOSS	WCF3930	Kodiak	0	0	2	0	2	0	0	0	0	0	0	0	4
HANJIN NAGOYA	3FJW8	New York City	0	6	0	0	0	0	0	0	0	0	0	0	6
HANJIN OSAKA	A8FS4	New York City	0	33	56	10	44	47	39	51	52	56	50	25	463
HANJIN OTTAWA	DANM	Anchorage	4	2	0	0	12	21	0	41	8	3	52	66	209
HANJIN PORTLAND	A8FS5	New York City	0	0	0	0	1	9	16	10	7	7	0	0	50
HANJIN SHANGHAI	3FGI5	New York City	21	13	0	0	7	2	2	4	0	22	6	0	77
HANSA CENTURY	DHHI	New York City	0	0	0	0	7	48	28	12	5	0	0	7	107
HANSA VISBY	ELWR5	Anchorage	83	38	49	48	47	36	0	62	46	55	56	51	571
HANSA VISBY	ELWR5	Anchorage	83	38	49	48	47	36	0	62	46	55	56	51	571
HATSU EAGLE	ZNZH6	Seattle	0	0	0	0	0	10	13	16	15	7	2	0	63
HATSU EAGLE	ZNZH6	Seattle	0	0	0	0	0	10	13	16	15	7	2	0	63
HATSU ELITE	VSJG7	Seattle	17	17	16	18	17	13	16	44	23	52	48	35	316
HATSU ELITE	VSJG7	Seattle	17	17	16	18	17	13	16	44	23	52	48	35	316
HATSU ENVOY	VSQL9	Seattle	24	26	38	50	40	9	6	10	2	21	1	0	227
HATSU ENVOY	VSQL9	Seattle	24	26	38	50	40	9	6	10	2	21	1	0	227
HATSU ETHIC	VQFS4	Seattle	22	21	15	16	19	17	11	17	21	7	15	18	199
HATSU ETHIC	VQFS4	Seattle	22	21	15	16	19	17	11	17	21	7	15	18	199
HATSU EXCEL	VSXV3	Seattle	6	7	7	4	10	8	3	9	18	18	17	21	128
HATSU SIGMA	MKKZ7	Seattle	0	0	0	0	0	0	0	0	0	0	0	13	13
HERBERT C. JACKSON	WL3972	Chicago	0	0	0	10	13	3	0	18	4	7	0	0	55
HERCULES	WBN2074	Anchorage	0	0	0	0	2	10	0	12	24	31	0	0	79
HI'IALAKAI	WTEY	Honolulu	0	19	34	65	69	78	33	67	60	92	0	0	517
HMI BRENTON REEF	WCY8453	Kodiak	50	33	59	72	45	53	37	56	43	48	2	8	506
HONOR	WDC6923	Baltimore	0	0	0	0	0	0	0	0	0	44	12	2	58
HOOD ISLAND	C6LU4	Miami	31	22	21	33	14	17	62	60	54	62	54	42	472
HORIZON ANCHORAGE	KGTX	Anchorage	99	169	196	90	70	232	243	189	240	388	276	180	2372
HORIZON CHALLENGER	WZJC	Jacksonville	72	21	60	64	68	41	49	36	38	74	58	66	647
HORIZON CONSUMER	WCHF	Los Angeles	48	59	58	55	55	50	48	34	46	53	34	52	592
HORIZON CRUSADER	WZJF	Jacksonville	54	50	46	64	70	76	81	83	58	53	41	40	716
HORIZON DISCOVERY	WZJD	Jacksonville	52	47	59	52	57	33	0	33	46	56	48	38	521
HORIZON ENTERPRISE	KRGB	San Francisco	561	113	14	5	49	471	756	685	513	724	669	593	5153
HORIZON FAIRBANKS	WPGJ	Anchorage	48	46	29	49	50	43	32	40	13	20	0	38	408
HORIZON HAWAII	KIRF	New York City	1	54	68	32	42	62	73	64	65	66	67	55	649
HORIZON KODIAK	KGTZ	Anchorage	68	58	57	63	103	186	66	59	57	57	46	52	872
HORIZON NAVIGATOR	WPGK	Los Angeles	40	31	46	41	55	38	41	58	40	57	54	51	552
HORIZON PACIFIC	WSRL	Los Angeles	82	77	73	50	72	55	56	61	51	33	82	83	775
HORIZON PRODUCER	WJBJ	New York City	79	68	94	73	71	60	68	83	67	58	71	52	844
HORIZON RELIANCE	WFLH	Los Angeles	80	68	77	81	74	61	68	90	81	85	67	70	902
HORIZON SPIRIT	WFLG	San Francisco	66	56	46	41	21	53	36	21	22	29	31	76	498
HORIZON TACOMA	KGTY	Anchorage	49	57	58	62	114	76	61	37	41	48	65	110	778
HORIZON TRADER	KIRH	San Francisco	33	0	49	44	55	49	57	55	46	56	66	67	577
HOUSTON	KCDK	Houston	15	16	13	0	0	21	13	7	7	3	18	43	156
HOWARD OLSEN	WDB7214	Kodiak	0	0	0	0	10	3	0	0	0	27	0	0	40
HYUNDAI GARNET	9VVN	New York City	33	25	2	21	7	36	33	58	76	62	77	75	505
IMAGINATION	C6FN2	Miami	0	0	0	0	0	0	1	0	0	0	0	0	1
INDEPENDENCE	WRYG	Baltimore	0	86	62	30	38	0	28	43	33	25	31	21	397
INDIAN OCEAN	C6T2063	New York City	18	14	22	9	3	15	37	36	15	29	11	36	245
INDOTRANS CELEBES	VRZN9	Norfolk	58	14	0	38	15	10	98	28	93	55	32	0	441
INLAND SEAS	WCJ6214	Chicago	0	0	0	0	1	0	1	0	0	0	0	0	2

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
INLET RESEARCH	KEC43	Anchorage	1	1	1	1	1	1	1	1	1	1	0	1	11
INSPIRATION	C6FM5	Anchorage	4	4	8	7	11	8	0	0	1	0	0	0	43
INTEGRITY	WDC6925	Baltimore	0	0	0	0	0	0	0	0	0	26	38	31	95
IRENES REMEDY	SYAQ	New York City	0	0	18	10	10	18	17	23	34	45	1	6	182
ISLAND CHAMPION	WCZ7046	Anchorage	0	0	0	0	15	13	2	1	12	2	0	0	45
ISLAND SCOUT	WDC6588	Anchorage	0	0	0	0	0	0	0	3	0	3	19	0	25
ISLAND WARRIOR	WDA9217	Anchorage	0	0	0	0	0	5	7	7	2	14	0	0	35
ITB BALTIMORE	WXKM	Baltimore	0	10	25	0	0	1	1	0	0	0	0	0	37
ITB JACKSONVILLE	WNDG	Baltimore	13	0	11	10	12	89	85	24	30	12	4	0	290
ITB NEW YORK	WVDG	Baltimore	3	5	18	21	10	5	0	13	14	0	11	10	110
IVER FOSS	WYE6442	Kodiak	0	0	0	0	0	14	0	0	0	10	18	0	42
JAG PRAKASH	AUBK	Anchorage	18	0	0	0	0	24	19	23	3	0	0	0	87
JAMES R. BARKER	WYP8657	Chicago	35	0	25	84	95	87	83	93	82	90	95	117	886
JEAN ANNE	WDC3786	New Orleans	0	0	16	67	44	31	0	68	72	43	36	63	440
JEFFREY FOSS	WCX4608	Kodiak	0	0	0	0	0	3	2	0	0	22	11	0	38
JENS MAERSK	OYYK2	New York City	63	41	39	49	32	42	46	36	64	50	45	48	555
JEPPESEN MAERSK	OWTW2	New York City	12	28	13	23	14	7	32	0	35	15	21	47	247
JOHANNES MAERSK	OWFD2	Miami	16	1	17	0	13	14	5	11	20	0	9	0	106
JOHN BRIX	WCY7560	Kodiak	0	6	0	4	3	0	0	0	0	0	0	0	13
JOHN G. MUNSON	WE3806	Chicago	1	0	4	0	0	0	0	0	0	0	0	0	5
JOHN N. COBB	WMVC	Anchorage	0	0	0	20	32	36	3	4	1	0	0	0	96
JOIDES RESOLUTION	D5BC	Norfolk	1	0	0	0	0	0	0	0	0	0	18	0	19
JOSEPH L. BLOCK	WDA2768	Chicago	4	0	0	0	0	0	0	0	0	2	0	0	6
JOSEPH SAUSE	WTW9258	Kodiak	0	0	0	0	0	0	0	0	2	0	0	0	2
JUDY LITRICO	KCKB	New Orleans	42	61	35	37	51	21	45	71	86	37	19	46	551
JUSTINE FOSS	WYL4978	Kodiak	1	20	24	0	7	6	4	0	7	2	0	0	71
JUTUL	LAVX5	Anchorage	0	0	0	6	0	0	0	0	0	0	7	12	25
KAPITAN AFANASYEV	P3XL7	Seattle	0	0	0	34	30	22	0	24	23	0	39	50	222
KAREN MAERSK	OZKN2	Seattle	0	0	0	0	0	0	0	26	63	52	48	42	231
KATHERINE	WUS5485	Kodiak	0	0	0	0	0	0	0	0	0	0	0	1	1
KAUAI	WSRH	Los Angeles	46	17	34	41	52	44	22	0	0	27	29	43	355
KAYE E. BARKER	WCF3012	Chicago	11	0	4	26	30	36	45	16	34	0	13	2	217
KEISHO	3FYN4	Seattle	21	0	0	0	0	0	0	0	0	0	0	0	21
KENAI	WSNB	Valdez	11	4	22	31	8	23	18	20	24	26	51	64	302
KENNICOTT	WCY2920	Kodiak	0	0	41	34	24	24	15	16	27	1	4	24	210
KILO MOANA	WDA7827	Honolulu	4	10	12	53	26	18	83	72	2	0	0	0	280
KIRSTEN MAERSK	OYDM2	Seattle	0	0	0	0	0	0	0	35	22	33	24	20	134
KIYI	KAO107	Chicago	0	0	0	0	0	0	1	7	2	3	2	0	15
KNORR	KCEJ	Jacksonville	0	0	0	0	0	33	0	58	79	39	9	0	218
KNUD MAERSK	OYBJ2	New York City	0	0	0	0	0	0	0	0	0	0	40	52	92
KOTZEBUE RESEARCH	KUU619	Anchorage	0	0	0	0	5	29	27	30	28	25	0	0	144
LAUREN FOSS	WDB3834	Kodiak	0	0	0	0	30	58	72	74	69	82	0	0	385
LEE A. TREGURTHA	WUR8857	Chicago	25	0	17	9	13	1	4	0	0	0	0	0	69
LEGEND OF THE SEAS	C6SL5	Miami	56	47	30	10	0	0	0	0	0	13	51	43	250
LEO FOREST	3FPH8	Seattle	0	0	0	41	55	26	35	15	15	0	0	0	187
LESLIE LEE	WYC7933	Kodiak	0	0	0	0	0	0	0	0	0	1	0	0	1
LEYLA KALKAVAN	TCCJ7	Norfolk	0	50	32	30	13	13	7	25	8	0	34	2	214
LIBERTY	WRYX	Baltimore	54	40	49	56	33	39	48	57	54	46	51	49	576
LIBERTY EAGLE	WHIA	Houston	20	44	29	48	31	61	26	45	22	12	11	0	349
LIBERTY GLORY	WADP	New Orleans	48	15	0	0	0	0	44	17	61	42	56	34	317
LIBERTY GRACE	WADN	New Orleans	33	37	0	46	13	25	14	11	41	6	22	35	283
LIBERTY SEA	C6UA5	New Orleans	0	0	0	0	0	58	1	0	15	11	12	0	97
LIBERTY SPIRIT	WCPU	New Orleans	31	0	30	8	1	0	0	8	7	0	4	23	112

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LIBERTY STAR	WCBP	New Orleans	42	26	58	63	49	58	50	64	28	37	43	71	589
LIBERTY SUN	WCOB	New Orleans	23	26	23	11	14	28	37	34	7	0	0	35	238
LIHUE	WTST	San Francisco	29	40	37	2	50	0	22	35	58	62	52	37	424
LNG CAPRICORN	V7BW8	New York City	38	41	42	15	13	21	20	32	34	50	36	69	411
LNG GEMINI	V7BW9	Kodiak	21	22	24	16	22	10	35	20	23	10	18	25	246
LNG LEO	V7BX2	New York City	18	0	0	23	25	18	34	56	52	32	21	23	302
LNG LIBRA	V7BX3	Anchorage	0	0	0	0	0	0	0	0	0	0	10	21	31
LNG TAURUS	V7BX4	New York City	44	50	14	16	14	7	3	1	25	24	48	101	347
LNG VIRGO	V7BX5	New York City	13	41	30	21	16	20	18	19	26	20	18	23	265
LOIS H.	WTD4576	Kodiak	0	0	1	0	1	0	1	0	3	0	0	0	6
LT GOING	IBTA	Seattle	0	0	0	0	0	0	0	7	9	10	0	0	26
LT UNICA	IBSM	Seattle	0	0	0	0	0	0	0	0	0	29	32	0	61
LT UNICORN	3FZC9	Seattle	0	0	0	0	0	0	0	0	14	12	10	3	39
LT UNITY	3FCD9	Seattle	1	1	0	1	0	0	0	0	0	0	0	0	3
LT USODIMARE	IBPO	Seattle	0	0	0	0	0	13	0	0	12	0	0	0	25
LTC CALVIN P. TITUS	KJLV	Jacksonville	28	19	6	28	7	5	0	0	0	0	0	0	93
LURLINE	WLVD	San Francisco	46	32	33	39	51	30	45	50	39	46	43	40	494
LYKES ACHIEVER	ZCDJ2	New Orleans	0	0	0	33	33	44	0	29	26	0	0	0	165
LYKES MOTIVATOR	WABU	Houston	55	41	47	52	65	37	64	63	80	54	61	52	671
MAASDAM	PFRO	Miami	29	38	35	30	38	0	22	23	21	14	58	81	389
MACKINAC BRIDGE	JKES	New York City	49	51	53	55	61	47	42	44	43	22	39	28	534
MADISON MAERSK	OVJB2	San Francisco	15	7	23	19	17	16	16	33	18	0	0	48	212
MAERSK ALASKA	KAKF	Baltimore	0	0	0	0	0	0	0	0	0	4	0	0	4
MAERSK ARIZONA	KAKG	Baltimore	6	0	0	0	3	19	33	32	7	0	0	0	100
MAERSK ARKANSAS	WDB9984	Baltimore	39	25	25	13	6	46	21	2	0	0	0	0	177
MAERSK CAROLINA	WBDS	Charleston	12	32	0	21	18	9	39	29	9	27	9	27	232
MAERSK CONSTELLATION	WRYJ	Houston	37	10	13	5	32	3	32	17	21	0	0	0	170
MAERSK DAMMAM	V2OE3	San Francisco	0	0	0	0	0	3	0	11	1	12	15	11	53
MAERSK GEORGIA	WAHP	New York City	0	6	30	7	6	10	0	42	40	27	26	7	201
MAERSK MISSOURI	WAHV	Norfolk	3	38	30	18	41	10	33	29	11	42	17	23	295
MAERSK NANTES	V2OO7	New York City	40	43	47	17	14	15	0	13	26	36	0	0	251
MAERSK NEWARK	A8CF2	New York City	37	34	20	42	55	58	53	1	0	18	37	13	368
MAERSK PECEM	V2OU9	Charleston	0	12	18	31	21	20	21	0	0	0	0	0	123
MAERSK SUN	S6ES	Seattle	0	0	0	0	0	0	0	0	0	0	70	68	138
MAERSK TAIKI	9VIG	Baltimore	5	22	5	2	0	0	0	0	0	0	0	0	34
MAERSK TAIYO	9VJO	Jacksonville	6	0	0	0	0	0	0	0	0	0	0	0	6
MAERSK TEAL	S6HK	Charleston	0	0	0	20	0	0	0	0	0	0	0	0	20
MAERSK TOLEDO	MZOJ8	Seattle	1	5	16	37	35	40	37	0	0	0	0	0	171
MAERSK VALENCIA	DAPG	New York City	81	63	8	6	7	19	0	45	40	29	0	8	306
MAERSK VIRGINIA	WAHK	Norfolk	0	0	0	0	0	0	0	0	0	11	0	10	21
MAERSK WAVE	S6TV	Baltimore	0	31	82	61	57	40	40	49	48	21	14	6	449
MAERSK WIND	S6TY	Baltimore	76	70	91	0	41	58	10	7	22	19	22	7	423
MAGLEBY MAERSK	OUSH2	New York City	48	36	45	35	34	48	51	13	7	56	31	37	441
MAHIMAHI	WHRN	San Francisco	44	30	0	42	41	40	32	43	5	21	45	64	407
MAIA H.	WYX2079	Kodiak	8	1	3	9	0	0	0	0	0	4	14	0	39
MAJESTIC MAERSK	OUJH2	New York City	36	22	52	14	37	16	44	30	0	23	9	0	283
MANFRED NYSTROM	WCN3590	Kodiak	0	0	0	0	0	0	0	0	22	11	0	0	33
MANOA	KDBG	San Francisco	34	53	52	49	62	56	48	58	38	61	38	42	591
MANUKAI	WRGD	New York City	42	36	37	45	33	41	33	18	29	43	7	21	385
MANULANI	WDC4696	New York City	0	0	0	0	0	16	0	38	34	42	37	49	216
MARCY J	WCF4791	Kodiak	2	23	0	0	0	8	0	0	0	0	0	0	33

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MAREN MAERSK	OWZU2	Los Angeles	41	27	34	24	22	27	59	42	45	52	54	45	472
MARGRETHE MAERSK	OYSN2	Los Angeles	17	32	23	23	0	0	36	40	3	12	42	43	271
MARIE MAERSK	OULL2	New York City	59	0	60	0	57	0	41	36	50	52	43	41	439
MARIELLE BOLTEN	ELZH9	New York City	2	0	4	1	30	14	19	7	13	13	10	3	116
MARK HANNAH	WYZ5243	Chicago	0	0	1	3	6	7	10	1	1	2	1	0	32
MARLIN	6ZXG	New Orleans	0	0	0	1	78	64	62	62	29	53	21	30	400
MARTORELL	HPNE	New York City	70	62	62	49	25	82	60	67	29	0	0	0	506
MATANUSKA	WN4201	Kodiak	6	0	0	0	8	0	0	0	0	0	0	0	14
MATHILDE MAERSK	OUUU2	Los Angeles	14	28	16	42	20	56	48	75	13	9	36	39	396
MATSONIA	KHRC	San Francisco	43	59	47	22	21	19	23	6	29	51	51	42	413
MAUI	WSLH	Los Angeles	19	27	36	48	40	33	31	16	25	28	18	15	336
MAUNAWILI	WDB7104	New York City	47	46	46	41	33	25	47	59	50	28	11	21	454
MAYVIEW MAERSK	OWEB2	San Francisco	47	23	21	33	28	11	31	36	51	28	35	42	386
MCARTHUR II	WTEJ	Seattle	0	0	0	20	111	115	157	214	184	185	177	17	1180
MCKEE SONS	WCZ9703	Chicago	13	0	32	75	86	56	89	98	28	2	3	92	574
MC-KINNEY MAERSK	OUZW2	New York City	19	16	15	20	13	13	22	24	20	17	48	18	245
MEKONG PIONEER	V2JN	Miami	28	36	42	40	32	36	35	69	64	61	51	57	551
MELVILLE	WECB	Los Angeles	34	79	89	84	75	58	52	53	21	1	0	0	546
MERCURY	C6SQ6	Miami	10	6	4	3	2	5	13	6	0	0	2	3	54
MERKUR	PJTA	New York City	0	0	0	0	0	0	0	0	637	722	696	675	2730
MESABI MINER	WYQ4356	Chicago	57	0	3	32	46	23	3	25	5	11	31	50	286
METTE MAERSK	OXKT2	Los Angeles	0	7	32	27	25	60	52	50	36	44	47	44	424
MICHIGAN	WRB4141	Chicago	0	0	0	0	0	0	2	0	1	0	0	0	3
MIDDLETOWN	WR3225	Chicago	0	0	0	0	0	0	0	62	24	1	28	22	137
MIDNIGHT SUN	WAHG	Seattle	63	84	69	61	73	72	81	57	66	65	84	216	991
MIKI HANA	WTW9252	Kodiak	5	2	0	0	1	0	0	0	0	0	0	0	8
MILLER FREEMAN	WTDM	Seattle	0	58	104	92	151	103	119	134	128	128	0	0	1017
MOKIHANA	WNRD	San Francisco	55	73	64	30	40	40	25	34	41	47	54	31	534
MOKU PAHU	WBWK	San Francisco	29	24	10	44	32	50	55	0	17	25	53	10	349
MOL COMMITMENT	9VID2	Charleston	35	38	47	37	34	1	3	0	0	0	0	0	195
MOL INNOVATION	9VVP	San Francisco	18	23	43	12	32	20	10	0	0	28	48	39	273
MOL THAMES	3EFV8	Norfolk	0	0	0	0	5	16	13	12	8	0	0	0	54
MOL VELOCITY	9VVK	Seattle	39	18	41	40	40	41	36	60	28	55	31	55	484
MONTAUK	WDCJ	New Orleans	43	27	10	2	7	11	59	75	89	52	60	33	468
MSC DIEGO	3FZP8	New York City	0	0	0	0	0	0	0	18	13	17	1	0	49
MSC DONATA	A8EU2	Anchorage	48	34	37	28	32	28	0	36	22	36	0	23	324
MSC MATILDE	HODP	New York City	45	29	9	6	6	7	2	16	5	4	3	0	132
NANCY FOSTER	WTER	Norfolk	13	65	34	44	45	47	51	79	44	25	0	0	447
NANUQ	WCY8498	Valdez	0	0	1	2	2	3	0	3	1	0	1	1	14
NATOMA	WBB5799	Kodiak	0	1	0	0	0	0	1	0	0	0	0	0	2
NAVAJO	WCT5737	Kodiak	18	11	6	20	9	4	3	0	0	0	11	0	82
NAVIGATOR	WBO3345	Anchorage	2	0	41	1	0	0	0	0	0	41	56	0	141
NAVIGATOR OF THE SEAS	C6FU4	Miami	20	23	1	18	2	22	8	1	0	26	8	2	131
NEW HORIZON	WKWB	Los Angeles	19	39	53	36	0	10	32	45	14	0	4	0	252
NOAA SHIP KA'IMIMOANA	WTEU	Honolulu	0	33	76	49	30	65	106	64	102	52	73	69	719
NORASIA ATLAS	A8GX4	New York City	0	0	0	45	54	12	21	14	5	6	0	3	160
NORASIA SILS	HBDF	New York City	0	0	0	0	0	0	19	27	14	33	30	14	137
NORCOASTER	WYP7276	Kodiak	0	0	2	2	0	0	0	1	0	1	2	0	8
NORTH STAR	KIYI	Seattle	68	59	53	42	60	71	60	65	107	96	78	193	952
NORTHERN VICTOR	WCZ6534	Kodiak	4	3	5	3	0	6	0	0	0	13	0	0	34
NORTHWEST EXPLORER	WCZ9007	Kodiak	0	0	0	0	0	0	2	0	0	0	0	0	2

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NORWEGIAN DREAM	C6LG5	New Orleans	20	12	9	1	10	0	0	0	0	0	0	0	52
NORWEGIAN SEA	C6DM2	Houston	12	13	17	22	20	11	0	0	0	0	0	0	95
NOVA TERRA	C6IZ7	Miami	29	31	19	19	0	0	0	14	24	56	1	31	224
NUKA ISLAND	WAR2130	Anchorage	0	0	1	0	0	0	0	0	0	0	0	0	1
NUNANIQ	WRC2049	Anchorage	0	0	0	0	0	0	0	0	7	21	5	0	33
OCEAN AMERICA	WSWM	Houston	0	0	0	0	0	0	0	2	5	0	0	0	7
OCEAN CONFIDENCE	V7EA2	Houston	0	0	0	0	0	8	74	16	6	0	0	0	104
OCEAN MARINER	WCF3990	Anchorage	0	0	0	3	0	0	0	0	10	7	0	0	20
OCEAN NAVIGATOR	WSC2552	Anchorage	0	0	0	0	0	0	0	0	1	0	0	0	1
OCEAN PREFACE	VRUL7	New Orleans	18	10	10	5	0	0	1	0	2	0	0	0	46
OCEAN RANGER	WAM7635	Anchorage	0	0	0	32	15	3	26	0	9	43	2	0	130
OCEAN RELIANCE	WADY	Kodiak	21	22	23	15	4	16	4	22	7	1	22	66	223
OCEAN SERVICE	WTW9263	Kodiak	0	1	0	0	0	0	0	0	0	0	0	0	1
OCEAN STAR	V7EB6	Houston	0	0	0	0	0	0	8	0	0	0	0	0	8
OCEAN TITAN	WDC7175	Jacksonville	1	13	5	4	1	3	3	1	0	25	90	38	184
OCEAN VALIANT	V7EB7	Houston	0	0	0	0	0	0	119	28	2	0	0	0	149
OCEAN VICTORY	V7EB8	Kodiak	2	0	0	0	0	0	0	0	0	0	0	0	2
OGLEBAY NORTON	WAQ3521	Chicago	0	0	0	0	0	0	11	16	34	29	26	51	167
OLEANDER	PJJU	New York City	14	1	16	9	4	0	8	3	8	13	18	11	105
OLIVIA MAERSK	OXKO2	Miami	29	6	6	37	17	34	42	14	42	49	15	34	325
OOCL AMERICA	VRWE8	Seattle	9	16	19	12	4	15	17	16	9	17	16	14	164
OOCL CALIFORNIA	VRWC8	Seattle	55	30	41	22	32	16	29	31	23	32	32	25	368
OOCL FAIR	VRWB8	Los Angeles	23	7	14	9	7	12	10	16	27	31	11	23	190
OOCL FIDELITY	VRWG5	Los Angeles	13	7	27	14	25	13	24	18	23	7	0	8	179
OOCL FRIENDSHIP	VRWD3	Los Angeles	30	17	58	28	27	39	34	47	38	1	3	0	322
OOCL NETHERLANDS	VRVN6	Los Angeles	1	7	35	31	39	11	34	41	33	25	29	34	320
OOCL TIANJIN	VRAR7	Anchorage	0	0	0	0	34	33	0	51	36	29	32	16	231
OOSTERDAM	PBKH	Anchorage	4	2	0	0	0	0	0	0	0	35	28	9	78
ORANGE STAR	ELFS7	New York City	0	0	91	88	82	75	92	89	97	85	65	60	824
ORANGE WAVE	ELPX7	New York City	0	0	0	0	0	0	0	0	0	0	0	38	38
OREGON II	WTDO	New Orleans	55	87	110	77	51	70	65	102	0	42	58	0	717
ORIENTE SHINE	H9AL	Seattle	31	20	16	17	15	23	19	0	0	0	0	0	141
ORIENTE VICTORIA	3FVG8	Seattle	42	39	0	0	0	0	0	0	0	0	0	0	81
ORION VOYAGER	C6MC5	Baltimore	0	44	101	91	68	26	60	60	54	20	45	0	569
OSCAR DYSON	WTEP	Kodiak	0	1	0	0	0	0	158	167	68	0	0	0	394
OSCAR ELTON SETTE	WTEE	Jacksonville	43	43	25	27	21	55	56	59	24	54	11	0	418
OURO DO BRASIL	ELPP9	Baltimore	28	21	34	21	1	0	0	0	0	36	53	50	244
OVERSEAS CHICAGO	KBCF	Valdez	4	27	31	7	0	31	0	0	0	0	0	0	100
OVERSEAS HARRIETTE	WRFJ	Houston	1	0	14	49	33	47	20	7	2	0	3	5	181
OVERSEAS JOYCE	WUQL	Jacksonville	29	19	22	13	17	13	18	26	26	19	15	19	236
OVERSEAS MARILYN	WFQB	Houston	0	0	0	0	30	13	17	0	0	29	26	31	146
OVERSEAS NEW ORLEANS	WFKW	Houston	47	34	29	38	40	46	34	41	22	32	37	39	439
OVERSEAS NEW YORK	WMCK	Valdez	25	22	22	9	10	7	11	0	2	5	0	0	113
OVERSEAS PHILADELPHIA	WGDB	Miami	0	0	0	0	6	13	13	4	0	0	4	17	57
OVERSEAS WASHINGTON	WFGV	Valdez	29	23	39	21	7	0	0	28	2	0	0	0	149
P&O NEDLLOYD ANDES	ELYY5	Anchorage	15	34	80	68	29	0	0	0	14	10	0	0	250
P&O NEDLLOYD VERA CRUZ	WDC2886	Houston	0	34	52	32	14	0	0	2	0	0	0	0	134
PACIFIC AVENGER	WCY8175	Kodiak	3	32	8	6	110	5	0	0	0	0	0	0	164
PACIFIC CHALLENGER	WDA3588	Kodiak	356	295	123	0	0	6	67	53	86	198	387	119	1690
PACIFIC FREEDOM	WDJF	Kodiak	0	0	0	3	12	0	0	0	0	0	0	0	15

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PACIFIC PATRIOT	WDB6493	Kodiak	40	0	28	54	25	33	123	8	83	28	2	0	424
PACIFIC RAVEN	WDB7583	Kodiak	76	37	99	184	266	163	200	263	185	191	1	35	1700
PACIFIC STAR	WCW7740	Kodiak	0	1	0	0	0	0	0	0	0	0	0	0	1
PANDALUS	WAV7611	Anchorage	0	0	0	0	0	1	0	0	0	0	0	0	1
PARAGON	WDA2311	Kodiak	41	12	151	134	88	66	113	88	73	65	14	1	846
PATHFINDER	WBN8467	Valdez	5	0	2	2	2	1	16	9	9	2	24	41	113
PATRIOT	NL9WX	Kodiak	36	10	0	1	0	0	0	0	0	0	1	0	48
PATRIOT	WQVY	Baltimore	39	53	39	40	23	39	32	30	12	0	1	24	332
PAUL R. TREGURTHA	WYR4481	Chicago	34	0	7	65	65	84	54	100	136	93	95	124	857
PERSEVERANCE	WSKH	Houston	4	0	0	0	8	11	0	0	8	0	0	0	31
PHILADELPHIA	KSYP	Miami	0	0	0	2	39	34	27	34	37	22	9	26	230
PHOENIX VOYAGER	C6QE3	San Francisco	28	5	17	16	7	12	10	10	32	33	25	47	242
PHYLLIS DUNLAP	WDA6552	Kodiak	0	23	18	76	4	47	0	21	63	43	0	125	420
PITTSBURG	A8GP9	Baltimore	0	0	0	23	47	59	0	51	56	62	49	38	385
POINT BARROW	WBM5088	Anchorage	0	0	0	0	13	21	9	5	0	21	23	0	92
POLAR ADVENTURE	WAZV	New Orleans	40	17	50	33	29	18	26	7	22	44	6	0	292
POLAR ALASKA	KSBK	Valdez	51	38	8	12	41	43	14	16	19	28	38	16	324
POLAR CALIFORNIA	WMCV	Los Angeles	29	16	22	26	9	68	33	21	13	26	26	11	300
POLAR DISCOVERY	WACW	New Orleans	24	11	9	28	20	28	32	23	22	15	26	14	252
POLAR EAGLE	ELPT3	Anchorage	183	166	191	213	1	176	169	181	264	374	321	195	2434
POLAR ENDEAVOUR	WCAJ	New Orleans	13	10	11	28	22	28	20	19	8	16	26	19	220
POLAR RESOLUTION	WDJK	New Orleans	41	48	70	80	21	44	7	0	3	8	62	45	429
POWHATAN	WCZ5243	Kodiak	0	0	0	9	0	0	0	0	0	0	0	0	9
PREMIUM DO BRASIL	A8BL4	Baltimore	16	22	13	13	0	5	0	0	0	11	23	9	112
PRESIDENT ADAMS	WRYW	Los Angeles	69	66	64	60	45	61	82	67	62	40	77	21	714
PRESIDENT GRANT	WCY2098	Los Angeles	46	53	62	50	45	34	49	53	66	49	33	22	562
PRESIDENT JACKSON	WRYC	Los Angeles	38	37	37	45	45	31	49	69	67	58	51	77	604
PRESIDENT POLK	WRYD	Los Angeles	87	52	48	26	50	69	84	52	29	60	51	77	685
PRESIDENT TRUMAN	WNDP	Los Angeles	35	52	12	12	58	30	28	27	63	47	35	19	418
PRESIDENT WILSON	WCY3438	Los Angeles	54	41	38	31	21	36	7	27	41	50	27	12	385
PRESQUE ISLE	WZE4928	Chicago	0	0	0	4	34	35	0	19	19	7	13	8	139
PRIDE OF BALTIMORE II	WUW2120	Baltimore	0	0	1	16	64	45	54	55	9	0	0	0	244
PRINCE WILLIAM SOUND	WSDX	Valdez	16	13	13	30	2	1	0	0	0	0	0	0	75
PRINSENDAM	PBGH	Anchorage	0	0	0	0	0	0	0	0	0	0	0	5	5
PT. THOMPSON	WBN5092	Anchorage	0	0	0	0	0	0	0	0	1	37	23	0	61
PURITAN	ZCDH9	Miami	56	44	49	20	8	7	24	17	11	33	51	44	364
PUSAN SENATOR	DQVG	Seattle	23	14	1	10	1	5	12	3	25	21	0	42	157
PYXIS LEADER	H9ML	Jacksonville	0	0	0	0	59	78	0	94	42	0	0	0	273
R.J. PFEIFFER	WRJP	Los Angeles	1	10	44	32	11	1	15	37	25	8	10	19	213
R.V. DAY	WS6709	Kodiak	0	0	1	0	0	0	0	0	0	0	0	0	1
R/V ENDEAVOR	WCE5063	New York City	0	0	0	0	0	0	0	36	8	13	0	0	57
RAINIER	WTEF	Seattle	0	0	21	76	33	47	51	76	71	52	0	0	427
RANGER	WBN5979	Seattle	0	11	7	3	11	1	0	0	0	0	0	0	33
REBECCA LYNN	WCW7977	Chicago	0	0	0	0	2	2	3	2	7	2	0	1	19
RED DOG	KYU625	Kodiak	0	0	0	0	0	0	0	21	77	27	0	0	125
REDEEMER	WDA8432	Kodiak	0	0	0	0	0	0	0	0	0	8	0	0	8
REDOUBT	WCG3013	Anchorage	0	0	0	0	17	3	10	0	4	0	0	0	34
REGAL PRINCESS	ZCBU4	Anchorage	4	24	27	12	4	0	9	3	0	0	1	0	84
REGULUS VOYAGER	C6FE6	San Francisco	57	40	5	8	44	39	24	15	36	37	66	20	391
RESERVE	WE7207	Chicago	0	0	0	0	0	0	0	0	0	1	0	0	1
RESOLUTION	WBR6941	Kodiak	0	0	0	0	0	1	3	0	0	1	0	0	5

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RESOLVE	WCZ5535	Baltimore	11	27	18	13	1	10	6	4	6	17	3	11	127
RHAPSODY OF THE SEAS	C6UA2	Houston	15	16	27	19	28	17	5	35	13	29	10	0	214
RHINE FOREST	V7EI9	New Orleans	35	24	38	44	65	40	57	29	0	0	42	46	420
RICKMERS HAMBERG	V7DS3	New Orleans	16	4	2	1	0	0	0	0	0	2	34	13	72
RIO GALLEGOS I	HODT	Seattle	6	5	6	0	0	0	0	0	0	0	0	0	17
ROBERT C. SEAMENS	WDA4486	Kodiak	1	12	29	45	10	13	0	0	0	0	0	32	142
ROGER BLOUGH	WZP8164	Chicago	9	0	0	0	5	5	4	0	0	0	0	0	23
ROGER REVELLE	KAOU	New Orleans	83	53	62	86	68	61	66	67	85	16	0	0	647
RONALD H. BROWN	WTEC	New Orleans	75	68	63	0	0	0	52	72	74	57	97	14	572
ROTTERDAM	PDGS	Anchorage	24	52	21	4	13	26	20	39	11	34	38	30	312
ROUGHNECK	WTW9262	Kodiak	2	0	6	2	3	6	0	0	0	0	0	0	19
RUBIN ARTEMIS	3FAH7	Seattle	4	19	16	25	28	37	28	22	0	0	0	0	179
RUBIN PEARL	YJQA8	Seattle	55	18	62	42	51	34	0	0	29	65	59	50	465
RYNDAM	PHFV	Miami	4	2	14	11	11	0	0	0	5	41	17	0	105
S/R BAYTOWN	KFPM	Valdez	3	28	15	0	3	18	15	8	8	4	20	16	138
S/R COLUMBIA BAY	WFQE	Los Angeles	9	0	1	2	0	2	4	0	7	9	1	0	35
S/R KODIAK	KJDG	Valdez	0	25	31	0	0	0	0	0	0	0	0	0	56
S/R LONG BEACH	WHCA	Los Angeles	4	3	0	0	0	0	0	0	0	0	0	0	7
S/R PUGET SOUND	WXBZ	Valdez	0	0	0	3	6	0	0	0	1	0	0	0	10
S/R WILMINGTON	WBVZ	Houston	0	3	0	0	5	11	20	1	0	0	4	28	72
SAFMARINE ZAMBEZI	A8CE9	New York City	64	30	13	10	2	11	0	0	0	0	0	0	130
SAKURA	V2AK3	New York City	0	0	0	0	0	0	0	34	22	19	22	34	131
SALLY MAERSK	OZHS2	Seattle	58	3	1	0	0	11	6	1	70	0	6	0	156
SAM M. TAALAK	WCX5321	Kodiak	0	0	0	0	1	19	6	26	44	28	9	0	133
SAMSON MARINER	WCN3586	Kodiak	10	6	10	3	8	13	11	14	4	13	16	1	109
SANDRA FOSS	WYL4908	Kodiak	0	0	0	0	0	20	3	0	1	13	24	0	61
SANTA BARBARA	MGYF6	Seattle	0	0	0	29	13	30	45	40	49	66	36	42	350
SARGASSO	H9YR	Houston	0	0	0	0	0	0	0	0	0	1	10	8	19
SAUDI ABHA	HZRX	Baltimore	16	51	30	19	12	20	2	32	23	2	3	15	225
SAUDI DIRIYAH	HZZB	Houston	23	3	50	35	9	1	0	0	0	0	0	0	121
SAUDI HOFUF	HZZC	Houston	11	14	24	16	13	11	14	22	13	9	13	38	198
SAUDI TABUK	HZZD	Houston	38	22	55	64	61	14	0	33	5	59	62	28	441
SCHACKENBORG	ZCIH7	Houston	20	28	70	69	40	6	35	42	36	0	0	9	355
SEA HAWK	WDA3282	Kodiak	0	0	0	22	0	11	0	0	0	0	0	0	33
SEA PRINCE	WYT8569	Anchorage	25	72	34	29	60	86	120	87	62	108	44	16	743
SEA RANGER	WBM8733	Anchorage	0	0	0	0	18	18	11	24	13	21	6	0	111
SEA RELIANCE	WEOB	Kodiak	9	3	4	0	0	0	0	0	0	0	0	0	16
SEA STORM	WCV9132	Kodiak	0	0	0	0	0	1	0	0	0	0	0	0	1
SEA VENTURE	WCC7684	Anchorage	0	0	0	0	0	1	19	0	0	0	0	0	20
SEA VICTORY	WCY6777	Anchorage	0	0	0	0	0	13	45	0	0	0	0	0	58
SEA VIKING	WCE8951	Anchorage	0	0	0	7	23	35	5	28	2	0	0	7	107
SEA VOYAGER	WCX9106	Valdez	45	45	56	52	51	55	48	11	0	0	0	0	363
SEABULK AMERICA	WWYY	Kodiak	1	0	0	0	56	26	0	7	87	52	97	75	401
SEABULK ARCTIC	WCY7054	Kodiak	34	18	18	22	34	26	24	17	32	29	18	33	305
SEABULK MONTANA	WCW9126	Anchorage	237	100	108	107	109	111	135	106	125	126	115	46	1425
SEABULK NEVADA	WCY2306	Anchorage	0	0	0	0	0	0	0	0	0	0	0	55	55
SEABULK PRIDE	WCY7052	Kodiak	20	24	34	40	72	27	17	44	37	29	44	17	405
SEABULK TRADER	KNJK	Miami	30	42	35	36	26	33	62	16	3	5	10	9	307
SEA-LAND ACHIEVER	WPKD	Houston	60	67	41	34	51	58	44	25	18	16	33	48	495
SEA-LAND ATLANTIC	KRLZ	Houston	54	38	33	52	49	39	44	44	44	47	42	47	533
SEA-LAND CHAMPION	MCDZ2	San Francisco	28	18	2	18	23	0	23	26	39	57	13	26	273

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SEA-LAND COMET	WDB9950	Norfolk	49	67	49	41	16	35	43	30	46	34	42	65	517
SEA-LAND COMMITMENT	KRPB	Houston	56	60	57	56	59	32	53	59	78	57	78	59	704
SEA-LAND DEFENDER	KGJB	San Francisco	92	51	79	37	0	0	0	0	0	0	0	0	259
SEA-LAND DEVELOPER	KHRH	Houston	35	2	63	60	12	0	0	0	0	17	0	15	204
SEA-LAND EAGLE	MCDZ9	Los Angeles	0	0	16	31	21	43	24	23	17	13	49	37	274
SEA-LAND ENDURANCE	V7HX3	Seattle	0	0	0	0	12	10	10	0	6	0	0	0	38
SEA-LAND EXPRESS	V7HH7	Los Angeles	0	0	4	36	14	1	2	0	0	0	22	74	153
SEA-LAND FLORIDA	KRHX	Houston	48	54	45	51	77	65	76	61	76	79	52	54	738
SEA-LAND FREEDOM	V7AM3	Norfolk	1	42	47	27	0	0	0	0	0	0	0	0	117
SEA-LAND INDEPENDENCE	WGJC	Los Angeles	31	28	25	58	2	0	0	0	0	0	0	0	144
SEA-LAND INNOVATOR	V7IA8	Seattle	0	0	0	0	8	6	0	0	0	0	0	0	14
SEALAND INTEGRITY	V7IP8	Houston	166	301	388	425	257	25	18	60	43	39	36	15	1773
SEA-LAND INTREPID	WDB9949	Charleston	35	11	11	2	30	20	1	35	12	7	30	38	232
SEA-LAND LIBERATOR	V7IQ2	Charleston	0	0	0	0	0	0	0	0	0	2	31	67	100
SEA-LAND MERCURY	MCDW9	San Francisco	75	67	44	31	40	30	51	38	59	29	0	27	491
SEA-LAND METEOR	WDB9951	Miami	23	22	14	17	30	36	45	37	37	39	39	42	381
SEA-LAND MOTIVATOR	WAAH	Houston	40	67	94	79	81	75	88	76	89	91	85	63	928
SEA-LAND PERFORMANCE	KRPD	Houston	23	33	25	24	22	29	40	59	66	49	47	42	459
SEA-LAND PRIDE	WDB9444	Houston	65	68	89	61	59	83	113	71	53	83	63	79	887
SEA-LAND QUALITY	KRNJ	Houston	12	31	36	47	45	52	52	60	41	49	47	38	510
SEA-LAND RACER	MCDW2	Charleston	25	21	0	0	0	0	0	0	0	0	0	14	60
SEA-LAND VOYAGER	KHRK	Los Angeles	68	53	50	37	25	0	0	0	0	0	0	0	233
SELMA KALKAVAN	V7GX5	Norfolk	33	59	60	72	53	38	17	48	39	52	39	48	558
SENECA	WBN8469	Anchorage	0	0	0	0	50	63	14	57	25	16	0	0	225
SIDNEY FOSS	WYL5445	Kodiak	35	33	33	32	15	31	7	12	4	12	6	6	226
SIKU	WCQ6174	Anchorage	0	0	0	0	0	0	0	0	0	2	0	0	2
SILKEBORG	EIJV	Houston	0	0	31	40	26	25	77	44	32	74	32	21	402
SILVER SPRAY	WAO9040	Kodiak	4	4	0	0	0	0	0	0	0	0	0	0	8
SINE MAERSK	OZOK2	Seattle	0	0	49	0	15	7	0	9	0	16	18	0	114
SINUK	WCQ8110	Anchorage	0	0	0	86	119	138	144	122	142	140	71	0	962
SIOUX	WBN7617	Anchorage	0	0	0	0	0	0	0	33	83	54	161	0	331
SKAGEN MAERSK	OYOS2	Seattle	0	0	0	0	0	0	0	3	0	0	0	0	3
SKANDERBORG	ZCIG4	Houston	23	0	0	0	15	20	0	0	0	0	0	0	58
SKODSBORG	ZCIJ7	Baltimore	26	10	10	17	15	8	54	38	0	24	19	13	234
SNOHOMISH	WSQ8098	Kodiak	0	0	0	0	13	9	1	1	0	0	0	0	24
SOFIE MAERSK	OZUN2	Seattle	0	56	5	17	46	0	25	3	10	39	0	53	254
SOL DO BRASIL	ELQQ4	Baltimore	0	4	6	9	14	17	20	19	28	9	1	4	131
SOROE MAERSK	OYKJ2	Seattle	38	0	33	13	1	35	0	11	11	0	46	7	195
SOUND RELIANCE	WXAE	Kodiak	6	138	23	36	5	35	9	7	0	13	4	56	332
SPIRIT OF OCEANUS	C6PJ8	Kodiak	0	0	0	0	0	2	3	0	0	0	0	0	5
SS BADGER	WBD4889	Chicago	0	0	0	0	0	9	6	5	5	3	0	0	28
ST PAUL RESEARCH	KEY796	Anchorage	0	3	6	1	0	0	0	0	0	0	0	6	16
ST. MARYS CHALLENGER	WDB9135	Chicago	8	0	0	0	0	0	7	22	17	12	9	0	75
STACEY FOSS	WYL4909	Kodiak	0	0	0	0	0	11	0	0	0	26	0	0	37
STAR ALABAMA	LAVU4	Baltimore	57	57	33	36	25	34	24	30	0	35	29	31	391
STAR AMERICA	LAVV4	Jacksonville	10	24	22	24	15	0	9	0	0	12	32	29	177
STAR EAGLE	LAWO2	Baltimore	31	23	0	0	25	20	45	0	20	44	0	40	248
STAR EVVIVA	LAHE2	Jacksonville	30	30	30	26	18	40	11	12	0	6	0	0	203
STAR FLORIDA	LAVW4	Houston	0	0	0	24	28	2	10	31	13	0	23	20	151
STAR GEIRANGER	LAKQ5	Seattle	0	35	25	0	31	34	0	0	0	52	47	38	262
STAR GRAN	LADR4	Los Angeles	0	19	18	13	22	0	0	0	0	0	0	0	72

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STAR GRINDANGER	LAKR5	Seattle	20	0	0	0	0	0	12	24	51	37	38	0	182
STAR HANSA	LAXP4	Jacksonville	0	0	41	12	28	29	5	31	25	0	0	8	179
STAR HARMONIA	LAGB5	Baltimore	40	48	13	21	20	38	67	36	14	51	7	31	386
STAR HERDLA	LAVD4	Baltimore	5	0	0	19	17	0	36	23	28	32	50	19	229
STAR HIDRA	LAVN4	Baltimore	19	0	5	0	18	15	0	0	3	0	0	0	60
STAR INDIANA	S6BE	Baltimore	33	18	17	14	11	0	0	0	0	0	0	0	93
STAR ISMENE	LANT5	Baltimore	30	28	26	25	0	0	17	11	23	27	34	24	245
STAR ISTIND	LAMP5	Houston	0	0	16	10	14	6	16	4	20	38	21	49	194
STAR JAPAN	LAZV5	Baltimore	13	51	38	35	85	0	46	42	44	24	43	69	490
STATENDAM	PHSG	Miami	27	40	27	14	0	0	3	1	37	81	44	59	333
STELLAR SEA	KGCJ	Kodiak	0	0	0	0	5	0	0	0	0	0	0	0	5
STELLAR VOYAGER	C6FV4	Seattle	5	3	1	3	0	0	0	0	0	0	0	0	12
STEWART J. CORT	WDC6055	Chicago	0	0	0	0	0	0	0	21	30	28	24	21	124
STIMSON	KF002	Kodiak	33	15	10	20	19	21	17	0	0	95	0	0	230
STRONG PATRIOT	WCZ8589	Norfolk	1	11	3	14	43	25	34	56	67	64	42	54	414
SUMIDA	3FMX7	New York City	0	0	0	4	13	11	142	231	225	205	200	152	1183
SUNBELT SPIRIT	V7DK4	New York City	0	0	26	16	9	3	18	18	18	12	21	16	157
SUSAN MAERSK	OYIK2	Seattle	46	0	12	2	0	19	0	10	9	0	12	0	110
SUSAN W. HANNAH	WAH9146	Chicago	0	0	0	0	6	2	0	0	0	0	0	0	8
SVEND MAERSK	OYJS2	Seattle	27	19	0	50	0	20	14	0	48	0	21	23	222
SWIFT ARROW	C6NI7	Anchorage	27	48	32	21	31	23	6	37	39	26	50	26	366
SYNERGY	NL9H	Kodiak	0	0	46	51	66	81	77	55	17	50	71	25	539
T/V ENTERPRISE	KVMU	New York City	74	76	0	0	0	0	0	0	0	0	0	0	150
T/V STATE OF MAINE	WCAH	Charleston	0	0	0	0	160	26	0	0	13	0	4	0	203
TAIO FRONTIER	3EZF5	Anchorage	56	50	62	29	17	0	22	0	21	4	1	0	262
TALISMAN	LAOW5	Jacksonville	21	0	1	37	20	0	0	17	15	0	34	16	161
TAMESIS	LAOL5	Norfolk	0	11	0	0	12	9	0	18	0	0	0	0	50
TAMPA	LMWO3	Baltimore	11	10	8	0	18	12	14	0	23	30	43	0	169
TAN'ERLIQ	WCY8497	Valdez	0	2	7	0	2	9	2	7	3	0	0	2	34
TAUSALA SAMOA	V2FA2	Los Angeles	30	27	31	24	27	31	35	7	0	0	0	0	212
TENACIOUS	WTK2123	Kodiak	1	0	0	0	0	0	1	0	3	0	0	0	5
TEXAS CLIPPER II	KVWA	Houston	0	0	0	0	0	43	32	0	0	0	0	0	75
THOMAS G. THOMPSON	KTDQ	Seattle	0	0	0	12	71	62	33	43	62	17	21	14	335
THOMAS JEFFERSON	WTEA	Norfolk	0	0	0	0	12	6	0	0	54	44	0	0	116
TIGER	WCE2134	Kodiak	0	0	1	0	0	0	0	0	0	0	0	0	1
TIGLAX	WZ3423	Anchorage	0	0	0	0	1	2	3	19	7	0	0	0	32
TITAN	WAW9232	Kodiak	15	10	5	10	9	4	0	0	0	0	0	0	53
TOURCOING	9V6488	Norfolk	0	0	0	0	0	0	0	37	43	0	0	0	80
TREIN MAERSK	MSQQ8	Baltimore	21	26	31	22	35	4	0	9	22	9	11	21	211
TUSTUMENA	WNGW	Kodiak	103	88	18	21	19	13	20	20	25	21	20	0	368
TYCO DECISIVE	V7DI7	Baltimore	0	0	0	0	0	0	0	49	54	0	0	0	103
TYCO DURABLE	V7DI8	Baltimore	9	54	1	41	70	0	21	0	0	0	0	0	196
TYCO RESPONDER	V7CY9	Baltimore	3	0	0	0	0	0	0	0	0	0	13	0	16
TYCOM RELIANCE	V7CZ2	Baltimore	0	0	0	0	0	0	0	0	0	3	20	12	35
TYONEK	WMH8	Anchorage	0	0	0	0	0	0	0	1	0	0	0	0	1
UBC SAIKI	P3GY9	Seattle	49	6	96	36	39	25	37	76	65	56	40	42	567
UBC SVEA	P3JA8	Seattle	39	29	31	37	64	28	35	21	24	38	23	39	408
UNITED SPIRIT	ELYB2	Seattle	52	70	66	41	77	71	61	79	80	80	68	77	822
USCGC ACUSHNET WMEC 167	NNHA	Kodiak	5	0	0	0	0	0	0	0	0	0	0	0	5
USCGC EAGLE	NRCB	Kodiak	0	0	0	0	6	0	0	0	0	0	0	0	6

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USCGC HEALY	NEPP	Seattle	0	0	0	0	14	120	148	88	116	94	86	0	666
USCGC MACKINAW	NRKP	Chicago	5	0	3	0	0	0	3	1	1	2	0	2	17
USCGC MAPLE (WLB 207)	NWBE	Kodiak	0	0	0	0	0	0	0	4	16	8	1	0	29
USCGC POLAR STAR	NBTM	Seattle	53	150	47	0	0	0	0	0	0	0	0	56	306
USCGC SPAR	NJAR	Kodiak	1	13	0	1	0	0	0	0	0	0	0	0	15
USNS 1ST LT HARRY L. MARTIN	NDFH	Jacksonville	1	0	0	0	0	0	0	0	0	0	0	0	1
VALDEZ RESEARCH	WXJ63	Valdez	0	0	0	0	0	0	0	233	221	232	226	242	1154
VALENCIA BRIDGE	HOUU	Anchorage	73	60	57	60	65	49	64	66	63	68	38	49	712
VANCOUVER BRIDGE	H8FE	Seattle	0	6	19	17	12	13	8	13	14	0	0	7	109
VEENDAM	C6NL6	Miami	23	0	0	0	0	2	0	0	5	20	63	44	157
VIKING STAR	WAS4138	Kodiak	3	4	5	0	8	0	2	0	1	11	0	3	37
VINCENT THOMAS BRIDGE	H3WJ	Seattle	0	0	33	57	53	33	32	40	29	42	39	38	396
VIRGINIA BRIDGE	HOKP	Anchorage	35	30	40	34	44	17	24	33	31	36	31	39	394
VIRGINIAN	KSPH	San Francisco	47	43	0	0	32	0	32	15	0	53	0	0	222
VIRGO VOYAGER	C6FG8	New Orleans	39	4	0	4	24	13	9	1	3	0	0	0	97
VLADIVOSTOK	P3BJ8	Seattle	0	0	0	25	49	61	0	67	55	7	31	6	301
VOLENDAM	PCHM	Anchorage	26	5	20	16	25	11	0	0	0	15	12	0	130
WARRIOR	WBN4383	Anchorage	0	0	0	0	0	0	0	0	0	1	0	0	1
WASHINGTON VOYAGER	KFDB	San Francisco	10	6	4	0	6	7	2	0	8	2	2	0	47
WECOMA	WSD7079	Seattle	77	38	80	99	49	67	83	70	78	35	0	0	676
WESTERDAM	PINX	Miami	2	21	22	2	0	0	0	0	1	17	26	15	106
WESTERN MARINER	WRB9690	Anchorage	0	0	0	0	0	1	1	0	0	0	0	0	2
WESTERN NAVIGATOR	WAX7602	Anchorage	0	0	0	0	0	0	0	0	0	0	0	3	3
WESTERN RANGER	WBN3008	Anchorage	6	6	10	3	18	17	12	0	1	0	0	0	73
WESTWARD VENTURE	KHJB	Seattle	0	23	5	70	35	43	51	44	64	30	36	23	424
WESTWOOD ANETTE	C6QO9	Seattle	7	5	2	18	25	11	9	11	6	7	10	27	138
WESTWOOD COLUMBIA	C6SI4	Seattle	32	39	53	41	47	42	42	42	35	59	49	48	529
WESTWOOD MARIANNE	C6QD3	Seattle	30	43	46	52	13	6	9	4	14	0	12	64	293
WESTWOOD OLYMPIA	C6UB2	Seattle	0	30	32	40	26	21	20	28	18	28	37	18	298
WESTWOOD RAINIER	C6SI3	Seattle	11	23	33	28	27	30	15	24	31	83	84	30	419
WESTWOOD VICTORIA	C6SI6	Seattle	44	34	33	34	33	27	25	28	31	30	33	39	391
WILFRED SYKES	WDA2769	Chicago	7	0	10	15	16	13	0	19	5	10	16	7	118
WILSON	WNPD	New Orleans	0	28	34	0	28	34	12	34	12	21	34	34	271
WOLDSTAD	KF001	Kodiak	17	4	18	6	7	51	28	9	0	24	10	0	174
WOLVERINE	WZC4518	Chicago	0	0	0	0	0	0	0	33	32	25	22	22	134
WORLD SPIRIT	ELWG7	Seattle	32	57	52	35	51	50	31	0	0	0	0	0	308
YM GENOVA II	ELVX2	New York City	49	43	66	57	61	52	76	75	77	68	57	63	744
ZAANDAM	PDAN	Miami	0	0	4	6	3	2	6	1	22	8	14	38	104
ZENITH	C6FU3	Miami	14	11	11	13	8	0	0	0	1	7	9	6	80
ZIM AMERICA	9HAB8	New York City	61	37	4	72	0	0	0	33	24	74	79	9	393
ZIM BEIJING	A8FU7	New York City	0	0	0	0	0	12	48	63	39	34	32	30	258
ZIM HONG KONG	9HGP7	Houston	38	13	0	0	0	0	29	0	18	44	0	12	154
ZIM SAVANNAH	A8ER9	New York City	0	0	0	1	2	0	7	10	20	46	13	21	120
ZIM SHENZHEN	VQUQ4	New York City	0	16	21	37	35	18	27	28	24	37	38	3	284
ZUIDERDAM	PBIG	Anchorage	0	0	0	0	0	0	0	0	0	6	11	0	17

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
TOTAL SHIPS: 741	14780	14,132	14,887	15,304	15,855	15,820	16,752	18,636	18,493	19,498	18,244	16,333	199,734

VOS Cooperative Ship Report: January through February 2006

Ship Name	Call	Port	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ADVANTAGE	WPPO	Norfolk	0	8	0	0	0	0	0	0	0	0	0	0	8
ALASKAN EXPLORER	WDB9918	Valdez	11	1	0	0	0	0	0	0	0	0	0	0	12
ALASKAN LEADER	WDB7918	Kodiak	23	28	0	0	0	0	0	0	0	0	0	0	51
ALASKAN NAVIGATOR	WDC6644	Valdez	10	25	0	0	0	0	0	0	0	0	0	0	35
ALBATROSS IV	WMVF	Norfolk	3	124	0	0	0	0	0	0	0	0	0	0	127
ALBEMARLE ISLAND	C6LU3	Miami	51	44	0	0	0	0	0	0	0	0	0	0	95
ALERT	WCZ7335	Valdez	19	21	0	0	0	0	0	0	0	0	0	0	40
ALKIN KALKAVAN	V7GY3	Norfolk	20	29	0	0	0	0	0	0	0	0	0	0	49
ALTAIR VOYAGER	C6OK	Baltimore	39	38	0	0	0	0	0	0	0	0	0	0	77
AMSTERDAM	PBAD	Anchorage	47	87	0	0	0	0	0	0	0	0	0	0	134
ANTARES VOYAGER	C6PZ3	Oakland	69	67	0	0	0	0	0	0	0	0	0	0	136
APL ALEXANDRITE	9VBA	Oakland	67	8	0	0	0	0	0	0	0	0	0	0	75
APL AMAZONITE	9VBX	Long Beach	59	41	0	0	0	0	0	0	0	0	0	0	100
APL CANADA	A8CG6	Oakland	62	45	0	0	0	0	0	0	0	0	0	0	107
APL CHINA	WDB3161	Long Beach	36	40	0	0	0	0	0	0	0	0	0	0	76
APL DALIAN	S6HU6	Norfolk	0	37	0	0	0	0	0	0	0	0	0	0	37
APL JADE	9VVD	New York City	2	0	0	0	0	0	0	0	0	0	0	0	2
APL JAPAN	S6TS	Seattle	82	45	0	0	0	0	0	0	0	0	0	0	127
APL KENNEDY	9VAY4	Seattle	55	50	0	0	0	0	0	0	0	0	0	0	105
APL KOREA	WCX8883	Long Beach	46	18	0	0	0	0	0	0	0	0	0	0	64
APL NEW YORK	A8GS3	New York City	15	38	0	0	0	0	0	0	0	0	0	0	53
APL PERU	V2OE2	New York City	41	35	0	0	0	0	0	0	0	0	0	0	76
APL SINGAPORE	WCX8812	Long Beach	39	50	0	0	0	0	0	0	0	0	0	0	89
APL SWEDEN	9VYY5	Seattle	7	63	0	0	0	0	0	0	0	0	0	0	70
APL THAILAND	WCX8882	Long Beach	37	26	0	0	0	0	0	0	0	0	0	0	63
APL TURQUOISE	9VVY	Oakland	28	32	0	0	0	0	0	0	0	0	0	0	60
ARCTIC OCEAN	C6T2062	New York City	0	35	0	0	0	0	0	0	0	0	0	0	35
ARCTIC SUN	ELQB8	Anchorage	508	366	0	0	0	0	0	0	0	0	0	0	874
ARTHUR M. ANDERSON	WE4805	Chicago	40	0	0	0	0	0	0	0	0	0	0	0	40
ASPHALT COMMANDER	WFJN	New Orleans	23	9	0	0	0	0	0	0	0	0	0	0	32
ATLANTIC CARTIER	SCKB	Norfolk	39	25	0	0	0	0	0	0	0	0	0	0	64
ATLANTIC OCEAN	C6T2064	New York City	32	42	0	0	0	0	0	0	0	0	0	0	74
ATLANTIS	KAQP	Kodiak	1	0	0	0	0	0	0	0	0	0	0	0	1
ATTENTIVE	WCZ7337	Valdez	22	9	0	0	0	0	0	0	0	0	0	0	31
AWARE	WCZ7336	Valdez	13	26	0	0	0	0	0	0	0	0	0	0	39
BARBARA ANDRIE	WTC9407	Chicago	3	0	0	0	0	0	0	0	0	0	0	0	3
BARRINGTON ISLAND	C6QK	Miami	79	64	0	0	0	0	0	0	0	0	0	0	143
BENGAL SEA	ELPL3	New York City	54	0	0	0	0	0	0	0	0	0	0	0	54
BERING LEADER	WDC7227	Kodiak	13	37	0	0	0	0	0	0	0	0	0	0	50
BERNARDO QUINTANA A	C6KJ5	New Orleans	65	49	0	0	0	0	0	0	0	0	0	0	114
BESIRE KALKAVAN	V7GY4	Norfolk	1	2	0	0	0	0	0	0	0	0	0	0	3
BREEZE ARROW	LAOT4	Seattle	64	47	0	0	0	0	0	0	0	0	0	0	111
BRUCE	WWU8	Anchorage	8	3	0	0	0	0	0	0	0	0	0	0	11
BUCCANEER	WYW5588	Valdez	7	1	0	0	0	0	0	0	0	0	0	0	8
BULWARK	WBN4113	Valdez	0	2	0	0	0	0	0	0	0	0	0	0	2
CAJUN EXPRESS	ELXL3	Houston	52	2	0	0	0	0	0	0	0	0	0	0	54
CAMAI	KF003	Kodiak	0	3	0	0	0	0	0	0	0	0	0	0	3
CARNIVAL CONQUEST	3FPQ9	New Orleans	27	186	0	0	0	0	0	0	0	0	0	0	213

CARNIVAL DESTINY	C6FN4	Miami	8	25	0	0	0	0	0	0	0	0	0	0	33
CARNIVAL FANTASY	H3GS	Jacksonville	0	52	0	0	0	0	0	0	0	0	0	0	52
CARNIVAL GLORY	3FPS9	Jacksonville	0	5	0	0	0	0	0	0	0	0	0	0	5
CARNIVAL LEGEND	H3VT	Miami	16	7	0	0	0	0	0	0	0	0	0	0	23
CARNIVAL LIBERTY	HPYE	Miami	0	10	0	0	0	0	0	0	0	0	0	0	10
CARNIVAL MIRACLE	H3VS	Miami	10	2	0	0	0	0	0	0	0	0	0	0	12
CARNIVAL PRIDE	H3VU	Miami	1	0	0	0	0	0	0	0	0	0	0	0	1
CARNIVAL SPIRIT	3FPR9	Anchorage	1	0	0	0	0	0	0	0	0	0	0	0	1
CARNIVAL TRIUMPH	C6FN5	Miami	39	41	0	0	0	0	0	0	0	0	0	0	80
CARNIVAL VALOR	H3VR	Miami	29	22	0	0	0	0	0	0	0	0	0	0	51
CARNIVAL VICTORY	3FFL8	Miami	31	27	0	0	0	0	0	0	0	0	0	0	58
CARSTEN MAERSK	OZYB2	Seattle	18	0	0	0	0	0	0	0	0	0	0	0	18
CELTIC SEA	C6RT	Miami	24	20	0	0	0	0	0	0	0	0	0	0	44
CENTURY	C6FU5	Miami	3	0	0	0	0	0	0	0	0	0	0	0	3
CERAM SEA	9VHB9	New Orleans	18	9	0	0	0	0	0	0	0	0	0	0	27
CHARLES ISLAND	C6JT	Miami	33	30	0	0	0	0	0	0	0	0	0	0	63
CHARLES M. BEEGHLEY	WL3108	Chicago	4	0	0	0	0	0	0	0	0	0	0	0	4
CHARLOTTE MAERSK	OWLD2	Seattle	20	25	0	0	0	0	0	0	0	0	0	0	45
CHEMICAL EXPLORER	KRGC	Houston	6	28	0	0	0	0	0	0	0	0	0	0	34
CHEMICAL PIONEER	KAFO	Houston	0	1	0	0	0	0	0	0	0	0	0	0	1
CHEMICAL TRADER	KRGJ	Houston	17	12	0	0	0	0	0	0	0	0	0	0	29
CHEROKEE BRIDGE	V7FW7	New York City	18	56	0	0	0	0	0	0	0	0	0	0	74
CHESAPEAKE BAY	WMLH	Norfolk	26	31	0	0	0	0	0	0	0	0	0	0	57
CHESAPEAKE BAY BRIDGE	V7FW8	New York City	20	37	0	0	0	0	0	0	0	0	0	0	57
CLEVELAND	KGXA	Houston	86	33	0	0	0	0	0	0	0	0	0	0	119
CLIFFORD MAERSK	OYRO2	Seattle	52	0	0	0	0	0	0	0	0	0	0	0	52
COASTAL RELIANCE	WADZ	Kodiak	58	57	0	0	0	0	0	0	0	0	0	0	115
COLD BAY RESEARCH	KCI95	Anchorage	6	0	0	0	0	0	0	0	0	0	0	0	6
COLLIER BROTHERS	WUU7551	Valdez	4	0	0	0	0	0	0	0	0	0	0	0	4
COLUMBINE MAERSK	OUHC2	Seattle	0	11	0	0	0	0	0	0	0	0	0	0	11
CONDOR	PJWQ	New York City	12	22	0	0	0	0	0	0	0	0	0	0	34
CORAL SEA	C6YW	Miami	10	32	0	0	0	0	0	0	0	0	0	0	42
CORNELIA MAERSK	OWWS2	Seattle	46	3	0	0	0	0	0	0	0	0	0	0	49
CORWITH CRAMER	WTF3319	Kodiak	0	40	0	0	0	0	0	0	0	0	0	0	40
COURAGE	WDC6907	Baltimore	26	14	0	0	0	0	0	0	0	0	0	0	40
COURTNEY L	ZCAQ8	Baltimore	55	49	0	0	0	0	0	0	0	0	0	0	104
CP DISCOVERER	WGXO	Houston	112	38	0	0	0	0	0	0	0	0	0	0	150
CP EAGLE	VSUA7	Anchorage	22	17	0	0	0	0	0	0	0	0	0	0	39
CP EVERGLADES	ZIYE7	Houston	1	11	0	0	0	0	0	0	0	0	0	0	12
CP EXPLORER	ZCDP2	Houston	16	47	0	0	0	0	0	0	0	0	0	0	63
CP JABIRU	A8CF4	Anchorage	80	78	0	0	0	0	0	0	0	0	0	0	158
CP LIBERATOR	WGXN	Houston	133	121	0	0	0	0	0	0	0	0	0	0	254
CP NAVIGATOR	WGMJ	Houston	100	204	0	0	0	0	0	0	0	0	0	0	304
CP VOYAGER	VSXC7	Anchorage	3	0	0	0	0	0	0	0	0	0	0	0	3
CP YOSEMITE	WDC6736	Houston	123	113	0	0	0	0	0	0	0	0	0	0	236
CSCL NEW YORK	VRBH7	Norfolk	45	0	0	0	0	0	0	0	0	0	0	0	45
CSL CABO	D5XH	Seattle	22	35	0	0	0	0	0	0	0	0	0	0	57
CYNTHIA FAGAN	KSDF	Houston	42	28	0	0	0	0	0	0	0	0	0	0	70
DAIO ANDES	3FDN9	Anchorage	1	49	0	0	0	0	0	0	0	0	0	0	50
DAVID STARR JORDAN	WTDK	Long Beach	1	120	0	0	0	0	0	0	0	0	0	0	121
DEEPWATER HORIZON	V7HC9	Houston	85	139	0	0	0	0	0	0	0	0	0	0	224
DEEPWATER MILLENNIUM	V7HD2	Houston	112	80	0	0	0	0	0	0	0	0	0	0	192
DELAWARE II	KNBD	New York City	56	41	0	0	0	0	0	0	0	0	0	0	97
DELAWARE TRADER	WDB3258	Houston	59	41	0	0	0	0	0	0	0	0	0	0	100
DENALI	WSVR	Long Beach	14	8	0	0	0	0	0	0	0	0	0	0	22

DIRCH MAERSK	OXQP2	Long Beach	7	31	0	0	0	0	0	0	0	0	0	0	38
DIRECT TUI	ELVZ5	Norfolk	671	518	0	0	0	0	0	0	0	0	0	0	1189
DISCOVERER DEEP SEAS	V7HC6	New Orleans	33	25	0	0	0	0	0	0	0	0	0	0	58
DISCOVERER ENTERPRISE	V7HD3	New Orleans	6	2	0	0	0	0	0	0	0	0	0	0	8
DISNEY MAGIC	C6PT7	Jacksonville	0	1	0	0	0	0	0	0	0	0	0	0	1
DREW FOSS	WYL5718	Kodiak	9	9	0	0	0	0	0	0	0	0	0	0	18
DUNCAN ISLAND	C6JS	Miami	19	7	0	0	0	0	0	0	0	0	0	0	26
EDYTH L	ZCAM4	Baltimore	44	45	0	0	0	0	0	0	0	0	0	0	89
EL MORRO	KCGH	Jacksonville	35	35	0	0	0	0	0	0	0	0	0	0	70
EL YUNQUE	WGJT	Jacksonville	32	26	0	0	0	0	0	0	0	0	0	0	58
ELATION	3FOC5	Miami	12	7	0	0	0	0	0	0	0	0	0	0	19
EMPRESS OF THE SEAS	C6SE6	Miami	4	4	0	0	0	0	0	0	0	0	0	0	8
ENDEAVOR	WAUW	New York City	27	26	0	0	0	0	0	0	0	0	0	0	53
ENDURANCE	WDA3359	Valdez	9	12	0	0	0	0	0	0	0	0	0	0	21
ENTERPRISE	WAUY	New York City	32	37	0	0	0	0	0	0	0	0	0	0	69
EVER DECENT	3FUO7	New York City	4	4	0	0	0	0	0	0	0	0	0	0	8
EVER DEVELOP	3FLF8	New York City	11	1	0	0	0	0	0	0	0	0	0	0	12
EVER DIADEM	3FOF8	New York City	0	1	0	0	0	0	0	0	0	0	0	0	1
EVER DIVINE	3FSA8	Norfolk	7	5	0	0	0	0	0	0	0	0	0	0	12
EVER REACH	3FQO4	New York City	15	8	0	0	0	0	0	0	0	0	0	0	23
EVER RENOWN	3FFR4	Long Beach	12	7	0	0	0	0	0	0	0	0	0	0	19
EVER UNION	3FFG7	Seattle	21	11	0	0	0	0	0	0	0	0	0	0	32
EVER UNISON	3FTL6	Seattle	1	0	0	0	0	0	0	0	0	0	0	0	1
EVER URANUS	3FCA9	Seattle	7	0	0	0	0	0	0	0	0	0	0	0	7
EVER USEFUL	3FCC9	Anchorage	0	6	0	0	0	0	0	0	0	0	0	0	6
EXPLORER OF THE SEAS	ELWX5	Miami	67	154	0	0	0	0	0	0	0	0	0	0	221
FAIRWEATHER	WTEB	Kodiak	21	0	0	0	0	0	0	0	0	0	0	0	21
FASCINATION	C6FM9	Miami	2	0	0	0	0	0	0	0	0	0	0	0	2
FRANCES L	ZCAM5	Baltimore	26	21	0	0	0	0	0	0	0	0	0	0	47
GEMINI VOYAGER	C6FE5	Long Beach	8	28	0	0	0	0	0	0	0	0	0	0	36
GENE DUNLAP	WAS2433	Kodiak	0	1	0	0	0	0	0	0	0	0	0	0	1
GEYSIR	WCZ5528	Norfolk	10	0	0	0	0	0	0	0	0	0	0	0	10
GLOIRE	3FPA6	Seattle	64	57	0	0	0	0	0	0	0	0	0	0	121
GREAT LAND	WFDP	Seattle	41	32	0	0	0	0	0	0	0	0	0	0	73
GREEN DALE	WCZ5238	Jacksonville	56	68	0	0	0	0	0	0	0	0	0	0	124
GREEN LAKE	WDDI	Baltimore	10	12	0	0	0	0	0	0	0	0	0	0	22
GREEN POINT	WCY4148	New York City	2	0	0	0	0	0	0	0	0	0	0	0	2
GROTON	KMJL	New York City	12	4	0	0	0	0	0	0	0	0	0	0	16
GSF EXPLORER	WCX5333	New Orleans	0	42	0	0	0	0	0	0	0	0	0	0	42
GUARDSMAN	WBN5978	Anchorage	91	40	0	0	0	0	0	0	0	0	0	0	131
GULF TITAN	WDA5598	Anchorage	2	8	0	0	0	0	0	0	0	0	0	0	10
HANJIN OTTAWA	DANM	Anchorage	86	69	0	0	0	0	0	0	0	0	0	0	155
HANJIN SHANGHAI	3FGI5	New York City	10	12	0	0	0	0	0	0	0	0	0	0	22
HANSA CENTURY	DHHI	New York City	17	4	0	0	0	0	0	0	0	0	0	0	21
HANSA VISBY	ELWR5	Anchorage	55	44	0	0	0	0	0	0	0	0	0	0	99
HATSU ELITE	VSJG7	Seattle	56	53	0	0	0	0	0	0	0	0	0	0	109
HATSU ENVOY	VSQL9	Seattle	21	14	0	0	0	0	0	0	0	0	0	0	35
HATSU ETHIC	VQFS4	Seattle	12	15	0	0	0	0	0	0	0	0	0	0	27
HATSU EXCEL	VSXV3	Seattle	17	12	0	0	0	0	0	0	0	0	0	0	29
HATSU SIGMA	MKKZ7	Seattle	10	7	0	0	0	0	0	0	0	0	0	0	17
HI'IALAKAI	WTEY	Honolulu	51	54	0	0	0	0	0	0	0	0	0	0	105
HMI BRENTON REEF	WCY8453	Kodiak	15	50	0	0	0	0	0	0	0	0	0	0	65
HONOR	WDC6923	Baltimore	11	17	0	0	0	0	0	0	0	0	0	0	28
HOOD ISLAND	C6LU4	Miami	27	38	0	0	0	0	0	0	0	0	0	0	65
HORIZON ENTERPRISE	KRGB	Oakland	508	601	0	0	0	0	0	0	0	0	0	0	1109

HORIZON ANCHORAGE	KGTX	Anchorage	196	170	0	0	0	0	0	0	0	0	0	0	366
HORIZON CHALLENGER	WZJC	Jacksonville	82	75	0	0	0	0	0	0	0	0	0	0	157
HORIZON CONSUMER	WCHF	Long Beach	24	2	0	0	0	0	0	0	0	0	0	0	26
HORIZON CRUSADER	WZJF	Jacksonville	32	35	0	0	0	0	0	0	0	0	0	0	67
HORIZON DISCOVERY	WZJD	Jacksonville	38	19	0	0	0	0	0	0	0	0	0	0	57
HORIZON FAIRBANKS	WPGJ	Anchorage	57	62	0	0	0	0	0	0	0	0	0	0	119
HORIZON HAWAII	KIRF	New York City	69	50	0	0	0	0	0	0	0	0	0	0	119
HORIZON KODIAK	KGTZ	Anchorage	59	56	0	0	0	0	0	0	0	0	0	0	115
HORIZON NAVIGATOR	WPGK	Long Beach	50	39	0	0	0	0	0	0	0	0	0	0	89
HORIZON PACIFIC	WSRL	Long Beach	53	45	0	0	0	0	0	0	0	0	0	0	98
HORIZON PRODUCER	WJBJ	New York City	66	69	0	0	0	0	0	0	0	0	0	0	135
HORIZON RELIANCE	WFLH	Long Beach	6	63	0	0	0	0	0	0	0	0	0	0	69
HORIZON SPIRIT	WFLG	Oakland	47	55	0	0	0	0	0	0	0	0	0	0	102
HORIZON TACOMA	KGTY	Anchorage	124	63	0	0	0	0	0	0	0	0	0	0	187
HORIZON TRADER	KIRH	Oakland	57	44	0	0	0	0	0	0	0	0	0	0	101
HOUSTON	KCDK	Houston	52	9	0	0	0	0	0	0	0	0	0	0	61
HYUNDAI GARNET	9VVN	New York City	43	16	0	0	0	0	0	0	0	0	0	0	59
IMAGINATION	C6FN2	Miami	0	6	0	0	0	0	0	0	0	0	0	0	6
INDEPENDENCE	WRYG	Baltimore	4	33	0	0	0	0	0	0	0	0	0	0	37
INDIAN OCEAN	C6T2063	New York City	33	29	0	0	0	0	0	0	0	0	0	0	62
INDOTRANS CELEBES	VRZN9	Norfolk	0	15	0	0	0	0	0	0	0	0	0	0	15
INLET RESEARCH	KEC43	Anchorage	1	0	0	0	0	0	0	0	0	0	0	0	1
INTEGRITY	WDC6925	Baltimore	52	51	0	0	0	0	0	0	0	0	0	0	103
IRENES REMEDY	SYAQ	New York City	18	25	0	0	0	0	0	0	0	0	0	0	43
ISLAND CHAMPION	WCZ7046	Anchorage	0	1	0	0	0	0	0	0	0	0	0	0	1
ISLAND WARRIOR	WDA9217	Anchorage	0	8	0	0	0	0	0	0	0	0	0	0	8
ITB JACKSONVILLE	WNDG	Baltimore	37	18	0	0	0	0	0	0	0	0	0	0	55
ITB NEW YORK	WVDG	Baltimore	4	27	0	0	0	0	0	0	0	0	0	0	31
JAMES R. BARKER	WYP8657	Chicago	66	0	0	0	0	0	0	0	0	0	0	0	66
JEAN ANNE	WDC3786	New Orleans	71	45	0	0	0	0	0	0	0	0	0	0	116
JENS MAERSK	OYYK2	New York City	23	16	0	0	0	0	0	0	0	0	0	0	39
JEPPESEN MAERSK	OWTW2	New York City	16	31	0	0	0	0	0	0	0	0	0	0	47
JUDY LITRICO	KCKB	New Orleans	55	39	0	0	0	0	0	0	0	0	0	0	94
JUTUL	LAVX5	Anchorage	32	18	0	0	0	0	0	0	0	0	0	0	50
KAPITAN AFANASYEV	P3XL7	Seattle	63	7	0	0	0	0	0	0	0	0	0	0	70
KAREN MAERSK	OZKN2	Seattle	56	23	0	0	0	0	0	0	0	0	0	0	79
KATRINE MAERSK	OZLL2	New York City	9	5	0	0	0	0	0	0	0	0	0	0	14
KAUAI	WSRH	Long Beach	30	26	0	0	0	0	0	0	0	0	0	0	56
KENAI	WSNB	Valdez	62	64	0	0	0	0	0	0	0	0	0	0	126
KENNICOTT	WCY2920	Kodiak	38	24	0	0	0	0	0	0	0	0	0	0	62
KILO MOANA	WDA7827	Honolulu	0	6	0	0	0	0	0	0	0	0	0	0	6
KIRSTEN MAERSK	OYDM2	Seattle	26	0	0	0	0	0	0	0	0	0	0	0	26
KNORR	KCEJ	Jacksonville	10	23	0	0	0	0	0	0	0	0	0	0	33
KNUD MAERSK	OYBJ2	New York City	21	2	0	0	0	0	0	0	0	0	0	0	23
LEGEND OF THE SEAS	C6SL5	Miami	24	23	0	0	0	0	0	0	0	0	0	0	47
LESLIE LEE	WYC7933	Valdez	0	4	0	0	0	0	0	0	0	0	0	0	4
LEYLA KALKAVAN	V7JG9	Norfolk	42	38	0	0	0	0	0	0	0	0	0	0	80
LIBERTY	WRYX	Baltimore	43	51	0	0	0	0	0	0	0	0	0	0	94
LIBERTY EAGLE	WHIA	Houston	4	41	0	0	0	0	0	0	0	0	0	0	45
LIBERTY GLORY	WADP	New Orleans	10	0	0	0	0	0	0	0	0	0	0	0	10
LIBERTY GRACE	WADN	New Orleans	2	30	0	0	0	0	0	0	0	0	0	0	32
LIBERTY SEA	C6UA5	New Orleans	3	7	0	0	0	0	0	0	0	0	0	0	10
LIBERTY SPIRIT	WCPU	New Orleans	16	40	0	0	0	0	0	0	0	0	0	0	56
LIBERTY STAR	WCBP	New Orleans	48	71	0	0	0	0	0	0	0	0	0	0	119
LIBERTY SUN	WCOB	New Orleans	0	31	0	0	0	0	0	0	0	0	0	0	31

LIHUE	WTST	Oakland	10	48	0	0	0	0	0	0	0	0	0	0	58
LNG CAPRICORN	V7BW8	New York City	42	59	0	0	0	0	0	0	0	0	0	0	101
LNG GEMINI	V7BW9	Anchorage	6	5	0	0	0	0	0	0	0	0	0	0	11
LNG LEO	V7BX2	New York City	14	5	0	0	0	0	0	0	0	0	0	0	19
LNG LIBRA	V7BX3	Anchorage	28	24	0	0	0	0	0	0	0	0	0	0	52
LNG TAURUS	V7BX4	New York City	56	10	0	0	0	0	0	0	0	0	0	0	66
LNG VIRGO	V7BX5	New York City	16	22	0	0	0	0	0	0	0	0	0	0	38
LT URBAN	3FXN9	Seattle	0	2	0	0	0	0	0	0	0	0	0	0	2
LURLINE	WLVD	Oakland	32	48	0	0	0	0	0	0	0	0	0	0	80
LYKES MOTIVATOR	WABU	Houston	0	22	0	0	0	0	0	0	0	0	0	0	22
MAASDAM	PFRO	Miami	80	51	0	0	0	0	0	0	0	0	0	0	131
MACKINAC BRIDGE	JKES	New York City	52	40	0	0	0	0	0	0	0	0	0	0	92
MADISON MAERSK	OVJB2	Oakland	64	37	0	0	0	0	0	0	0	0	0	0	101
MAERSK ARIZONA	KAKG	Baltimore	9	27	0	0	0	0	0	0	0	0	0	0	36
MAERSK CAROLINA	WBDS	Charleston	31	40	0	0	0	0	0	0	0	0	0	0	71
MAERSK CONSTELLATION	WRYJ	Houston	58	10	0	0	0	0	0	0	0	0	0	0	68
MAERSK DAMMAM	V2OE3	Oakland	7	8	0	0	0	0	0	0	0	0	0	0	15
MAERSK GEORGIA	WAHP	New York City	22	21	0	0	0	0	0	0	0	0	0	0	43
MAERSK MARYLAND	WAUU	New York City	11	0	0	0	0	0	0	0	0	0	0	0	11
MAERSK MISSOURI	WAHV	Norfolk	22	4	0	0	0	0	0	0	0	0	0	0	26
MAERSK NEUSTADT	C4AH2	Seattle	0	1	0	0	0	0	0	0	0	0	0	0	1
MAERSK NEVADA	WMLG	Norfolk	20	19	0	0	0	0	0	0	0	0	0	0	39
MAERSK NEWARK	A8CF2	New York City	18	16	0	0	0	0	0	0	0	0	0	0	34
MAERSK SUN	S6ES	Seattle	13	0	0	0	0	0	0	0	0	0	0	0	13
MAERSK VALENCIA	DAPG	New York City	10	9	0	0	0	0	0	0	0	0	0	0	19
MAERSK VIRGINIA	WAHK	Norfolk	4	25	0	0	0	0	0	0	0	0	0	0	29
MAERSK WAVE	S6TV	Baltimore	7	4	0	0	0	0	0	0	0	0	0	0	11
MAERSK WIND	S6TY	Baltimore	28	4	0	0	0	0	0	0	0	0	0	0	32
MAGLEBY MAERSK	OUSH2	New York City	21	4	0	0	0	0	0	0	0	0	0	0	25
MAHIMAHI	WHRN	Oakland	55	22	0	0	0	0	0	0	0	0	0	0	77
MAJESTIC MAERSK	OUJH2	New York City	27	40	0	0	0	0	0	0	0	0	0	0	67
MANOA	KDBG	Oakland	47	38	0	0	0	0	0	0	0	0	0	0	85
MANUKAI	WRGD	New York City	37	31	0	0	0	0	0	0	0	0	0	0	68
MANULANI	WDC4696	New York City	50	43	0	0	0	0	0	0	0	0	0	0	93
MAREN MAERSK	OWZU2	Long Beach	38	29	0	0	0	0	0	0	0	0	0	0	67
MARGRETHE MAERSK	OYSN2	Long Beach	41	14	0	0	0	0	0	0	0	0	0	0	55
MARIE MAERSK	OULL2	New York City	38	47	0	0	0	0	0	0	0	0	0	0	85
MARIELLE BOLTEN	ELZH9	New York City	6	0	0	0	0	0	0	0	0	0	0	0	6
MARLIN	6ZXG	New Orleans	77	65	0	0	0	0	0	0	0	0	0	0	142
MATANUSKA	WN4201	Kodiak	1	8	0	0	0	0	0	0	0	0	0	0	9
MATHILDE MAERSK	OUUU2	Long Beach	21	8	0	0	0	0	0	0	0	0	0	0	29
MATSONIA	KHRC	Oakland	50	45	0	0	0	0	0	0	0	0	0	0	95
MAUI	WSLH	Long Beach	46	0	0	0	0	0	0	0	0	0	0	0	46
MAUNAWILI	WDB7104	New York City	44	10	0	0	0	0	0	0	0	0	0	0	54
MAYVIEW MAERSK	OWEB2	Oakland	38	13	0	0	0	0	0	0	0	0	0	0	51
MCKEE SONS	WCZ9703	Chicago	23	0	0	0	0	0	0	0	0	0	0	0	23
MC-KINNEY MAERSK	OUZW2	New York City	4	28	0	0	0	0	0	0	0	0	0	0	32
MEKONG PIONEER	V2JN	Miami	68	53	0	0	0	0	0	0	0	0	0	0	121
MERCURY	C6SQ6	Miami	7	3	0	0	0	0	0	0	0	0	0	0	10
MERKUR	PJTA	New York City	681	374	0	0	0	0	0	0	0	0	0	0	1055
MESABI MINER	WYQ4356	Chicago	40	0	0	0	0	0	0	0	0	0	0	0	40
METTE MAERSK	OXKT2	Long Beach	40	23	0	0	0	0	0	0	0	0	0	0	63
MIDDLETOWN	WR3225	Chicago	5	0	0	0	0	0	0	0	0	0	0	0	5
MIDNIGHT SUN	WAHG	Seattle	115	14	0	0	0	0	0	0	0	0	0	0	129

MILLER FREEMAN	WTDM	Seattle	0	111	0	0	0	0	0	0	0	0	0	0	111
MOBILE	KXDB	New York City	24	3	0	0	0	0	0	0	0	0	0	0	27
MOKIHANA	WNRD	Oakland	37	30	0	0	0	0	0	0	0	0	0	0	67
MOKU PAHU	WBWK	Oakland	27	5	0	0	0	0	0	0	0	0	0	0	32
MOL COMMITMENT	9VID2	Charleston	13	53	0	0	0	0	0	0	0	0	0	0	66
MOL INNOVATION	9VVP	Oakland	47	58	0	0	0	0	0	0	0	0	0	0	105
MOL VELOCITY	9VVK	Seattle	41	0	0	0	0	0	0	0	0	0	0	0	41
MONTAUK	WDCJ	New Orleans	45	52	0	0	0	0	0	0	0	0	0	0	97
MSC DONATA	A8EU2	Anchorage	9	0	0	0	0	0	0	0	0	0	0	0	9
MSC ELENA	HPAU	New York City	0	3	0	0	0	0	0	0	0	0	0	0	3
MSC MATILDE	HODP	New York City	19	20	0	0	0	0	0	0	0	0	0	0	39
MSC ULSAN	C6SV2	New York City	14	28	0	0	0	0	0	0	0	0	0	0	42
NANUQ	WCY8498	Valdez	2	2	0	0	0	0	0	0	0	0	0	0	4
NATOMA	WBB5799	Kodiak	4	7	0	0	0	0	0	0	0	0	0	0	11
NAVAJO	WCT5737	Kodiak	3	8	0	0	0	0	0	0	0	0	0	0	11
NAVIGATOR OF THE SEAS	C6FU4	Miami	21	24	0	0	0	0	0	0	0	0	0	0	45
NOAA SHIP KA'IMIMOANA	WTEU	Honolulu	76	35	0	0	0	0	0	0	0	0	0	0	111
NOORDAM	PHET	Anchorage	0	27	0	0	0	0	0	0	0	0	0	0	27
NORASIA ATLAS	A8GX4	New York City	2	4	0	0	0	0	0	0	0	0	0	0	6
NORASIA SILS	HBDF	New York City	0	2	0	0	0	0	0	0	0	0	0	0	2
NORTH STAR	KIYI	Seattle	55	12	0	0	0	0	0	0	0	0	0	0	67
NORTHERN VICTOR	WCZ6534	Kodiak	8	0	0	0	0	0	0	0	0	0	0	0	8
NOVA TERRA	C6IZ7	Miami	4	25	0	0	0	0	0	0	0	0	0	0	29
OCEAN RELIANCE	WADY	Kodiak	19	3	0	0	0	0	0	0	0	0	0	0	22
OCEAN TITAN	WDB9647	Anchorage	0	5	0	0	0	0	0	0	0	0	0	0	5
OCEAN TITAN	WDC7175	Jacksonville	53	35	0	0	0	0	0	0	0	0	0	0	88
OGLEBAY NORTON	WAQ3521	Chicago	24	0	0	0	0	0	0	0	0	0	0	0	24
OLEANDER	PJJU	New York City	8	10	0	0	0	0	0	0	0	0	0	0	18
OLIVIA MAERSK	OXKO2	Miami	35	15	0	0	0	0	0	0	0	0	0	0	50
OOCL AMERICA	VRWE8	Seattle	19	21	0	0	0	0	0	0	0	0	0	0	40
OOCL CALIFORNIA	VRWC8	Seattle	31	15	0	0	0	0	0	0	0	0	0	0	46
OOCL FAIR	VRWB8	Long Beach	6	15	0	0	0	0	0	0	0	0	0	0	21
OOCL FIDELITY	VRWG5	Long Beach	9	3	0	0	0	0	0	0	0	0	0	0	12
OOCL FRIENDSHIP	VRWD3	Long Beach	8	24	0	0	0	0	0	0	0	0	0	0	32
OOCL NETHERLANDS	VRVN6	Long Beach	21	14	0	0	0	0	0	0	0	0	0	0	35
OOCL TIANJIN	VRAR7	Anchorage	19	14	0	0	0	0	0	0	0	0	0	0	33
OOSTERDAM	PBKH	Anchorage	1	3	0	0	0	0	0	0	0	0	0	0	4
ORANGE STAR	ELFS7	New York City	77	55	0	0	0	0	0	0	0	0	0	0	132
ORANGE WAVE	ELPX7	New York City	83	52	0	0	0	0	0	0	0	0	0	0	135
OREGON II	WTDO	New Orleans	0	59	0	0	0	0	0	0	0	0	0	0	59
OSCAR ELTON SETTE	WTEE	Jacksonville	38	71	0	0	0	0	0	0	0	0	0	0	109
OURO DO BRASIL	ELPP9	Baltimore	22	7	0	0	0	0	0	0	0	0	0	0	29
OVERSEAS HARRIETTE	WRFJ	Houston	8	0	0	0	0	0	0	0	0	0	0	0	8
OVERSEAS JOYCE	WUQL	Jacksonville	34	13	0	0	0	0	0	0	0	0	0	0	47
OVERSEAS MARILYN	WFQB	Houston	20	12	0	0	0	0	0	0	0	0	0	0	32
OVERSEAS NEW ORLEANS	WFKW	Houston	0	20	0	0	0	0	0	0	0	0	0	0	20
OVERSEAS PHILADELPHIA	WGDB	Miami	22	21	0	0	0	0	0	0	0	0	0	0	43
PACIFIC CHALLENGER	WDC7518	Kodiak	2	233	0	0	0	0	0	0	0	0	0	0	235
PACIFIC STAR	WCW7740	Valdez	1	0	0	0	0	0	0	0	0	0	0	0	1
PARADISE	3FOB5	Miami	0	34	0	0	0	0	0	0	0	0	0	0	34
PARAGON	WDC7523	Kodiak	4	50	0	0	0	0	0	0	0	0	0	0	54
PATHFINDER	WBN8467	Valdez	35	16	0	0	0	0	0	0	0	0	0	0	51
PATRIOT	WQVY	Baltimore	27	31	0	0	0	0	0	0	0	0	0	0	58

PAUL R. TREGURTHA	WYR4481	Chicago	81	0	0	0	0	0	0	0	0	0	0	0	81
PHILADELPHIA	KSYP	Miami	25	4	0	0	0	0	0	0	0	0	0	0	29
PHOENIX VOYAGER	C6QE3	Oakland	28	31	0	0	0	0	0	0	0	0	0	0	59
PHYLLIS DUNLAP	WDA6552	Kodiak	136	31	0	0	0	0	0	0	0	0	0	0	167
PICTON CASTLE	ZKWP	Anchorage	33	29	0	0	0	0	0	0	0	0	0	0	62
POLAR ADVENTURE	WAZV	New Orleans	15	25	0	0	0	0	0	0	0	0	0	0	40
POLAR ALASKA	KSBK	Valdez	17	34	0	0	0	0	0	0	0	0	0	0	51
POLAR CALIFORNIA	WMCV	Long Beach	9	20	0	0	0	0	0	0	0	0	0	0	29
POLAR DISCOVERY	WACW	New Orleans	13	13	0	0	0	0	0	0	0	0	0	0	26
POLAR EAGLE	ELPT3	Anchorage	181	139	0	0	0	0	0	0	0	0	0	0	320
POLAR ENDEAVOUR	WCAJ	New Orleans	30	30	0	0	0	0	0	0	0	0	0	0	60
POLAR RESOLUTION	WDJK	New Orleans	96	74	0	0	0	0	0	0	0	0	0	0	170
PREMIUM DO BRASIL	A8BL4	Baltimore	4	3	0	0	0	0	0	0	0	0	0	0	7
PRESIDENT ADAMS	WRYW	Long Beach	44	49	0	0	0	0	0	0	0	0	0	0	93
PRESIDENT GRANT	WCY2098	Long Beach	38	3	0	0	0	0	0	0	0	0	0	0	41
PRESIDENT JACKSON	WRYC	Long Beach	7	40	0	0	0	0	0	0	0	0	0	0	47
PRESIDENT POLK	WRYD	Long Beach	54	2	0	0	0	0	0	0	0	0	0	0	56
PRESIDENT TRUMAN	WNDP	Long Beach	30	45	0	0	0	0	0	0	0	0	0	0	75
PRESIDENT WILSON	WCY3438	Long Beach	33	43	0	0	0	0	0	0	0	0	0	0	76
PRESQUE ISLE	WZE4928	Chicago	6	0	0	0	0	0	0	0	0	0	0	0	6
PRINSENDAM	PBGH	Anchorage	18	3	0	0	0	0	0	0	0	0	0	0	21
PURITAN	ZCDH9	Miami	37	37	0	0	0	0	0	0	0	0	0	0	74
PUSAN SENATOR	DQVG	Seattle	38	15	0	0	0	0	0	0	0	0	0	0	53
R.J. PFEIFFER	WRJP	Long Beach	6	4	0	0	0	0	0	0	0	0	0	0	10
REGINA MAERSK	OZIN2	New York City	47	52	0	0	0	0	0	0	0	0	0	0	99
RESOLVE	WCZ5535	Baltimore	12	26	0	0	0	0	0	0	0	0	0	0	38
RHINE FOREST	V7EI9	New Orleans	61	41	0	0	0	0	0	0	0	0	0	0	102
RICHARD G MATTHIESEN	NBBP	Jacksonville	0	7	0	0	0	0	0	0	0	0	0	0	7
RICKMERS HAMBERG	V7DS3	New Orleans	17	3	0	0	0	0	0	0	0	0	0	0	20
ROBERT C. SEAMENS	WDA4486	Kodiak	5	21	0	0	0	0	0	0	0	0	0	0	26
ROGER REVELLE	KAOU	New Orleans	68	90	0	0	0	0	0	0	0	0	0	0	158
RONALD H. BROWN	WTEC	New Orleans	0	24	0	0	0	0	0	0	0	0	0	0	24
ROTTERDAM	PDGS	Anchorage	24	89	0	0	0	0	0	0	0	0	0	0	113
RUBIN PEARL	YJQA8	Seattle	46	25	0	0	0	0	0	0	0	0	0	0	71
RYNDAM	PHFV	Miami	13	25	0	0	0	0	0	0	0	0	0	0	38
S/R BAYTOWN	KFPM	Valdez	22	13	0	0	0	0	0	0	0	0	0	0	35
S/R PUGET SOUND	WXBZ	Valdez	7	2	0	0	0	0	0	0	0	0	0	0	9
S/R WILMINGTON	WBVZ	Houston	11	8	0	0	0	0	0	0	0	0	0	0	19
SAFMARINE ILLOVO	A8HJ8	New York City	22	29	0	0	0	0	0	0	0	0	0	0	51
SAKURA	V2AK3	New York City	45	31	0	0	0	0	0	0	0	0	0	0	76
SALISHAN	WUT4384	Kodiak	1	0	0	0	0	0	0	0	0	0	0	0	1
SALLY MAERSK	OZHS2	Seattle	0	2	0	0	0	0	0	0	0	0	0	0	2
SAMSON MARINER	WCN3586	Kodiak	4	2	0	0	0	0	0	0	0	0	0	0	6
SANTA BARBARA	MGYF6	Seattle	27	18	0	0	0	0	0	0	0	0	0	0	45
SARGASSO	H9YR	Houston	6	8	0	0	0	0	0	0	0	0	0	0	14
SAUDI ABHA	HZRX	Baltimore	8	44	0	0	0	0	0	0	0	0	0	0	52
SAUDI DIRIYAH	HZZB	Houston	0	19	0	0	0	0	0	0	0	0	0	0	19
SAUDI HOFUF	HZZC	Houston	6	21	0	0	0	0	0	0	0	0	0	0	27
SAUDI TABUK	HZZD	Houston	55	64	0	0	0	0	0	0	0	0	0	0	119
SCHACKENBORG	ZCIH7	Houston	79	25	0	0	0	0	0	0	0	0	0	0	104
SEA PRINCE	WYT8569	Anchorage	14	40	0	0	0	0	0	0	0	0	0	0	54
SEA RELIANCE	WEOB	Kodiak	50	19	0	0	0	0	0	0	0	0	0	0	69
SEABULK AMERICA	WWYY	Kodiak	83	40	0	0	0	0	0	0	0	0	0	0	123

SEABULK ARCTIC	WCY7054	Kodiak	28	13	0	0	0	0	0	0	0	0	0	0	41
SEABULK NEVADA	WCY2306	Anchorage	107	139	0	0	0	0	0	0	0	0	0	0	246
SEABULK PRIDE	WCY7052	Kodiak	34	18	0	0	0	0	0	0	0	0	0	0	52
SEABULK TRADER	KNJK	Miami	6	12	0	0	0	0	0	0	0	0	0	0	18
SEA-LAND ACHIEVER	WPKD	Houston	66	34	0	0	0	0	0	0	0	0	0	0	100
SEA-LAND ATLANTIC	KRLZ	Houston	55	41	0	0	0	0	0	0	0	0	0	0	96
SEA-LAND CHAMPION	MCDZ2	Oakland	23	29	0	0	0	0	0	0	0	0	0	0	52
SEA-LAND COMET	WDB9950	Norfolk	59	45	0	0	0	0	0	0	0	0	0	0	104
SEA-LAND COMMITMENT	KRPB	Houston	62	59	0	0	0	0	0	0	0	0	0	0	121
SEA-LAND DEFENDER	V7HX4	Oakland	0	30	0	0	0	0	0	0	0	0	0	0	30
SEA-LAND DEVELOPER	V7HZ7	Seattle	0	0	0	0	0	0	0	0	0	0	0	0	0
SEA-LAND EAGLE	MCDZ9	Long Beach	64	25	0	0	0	0	0	0	0	0	0	0	89
SEA-LAND EXPRESS	V7HH7	Long Beach	60	39	0	0	0	0	0	0	0	0	0	0	99
SEA-LAND FLORIDA	KRHX	Houston	73	46	0	0	0	0	0	0	0	0	0	0	119
SEA-LAND INNOVATOR	V7IA8	Seattle	11	24	0	0	0	0	0	0	0	0	0	0	35
SEA-LAND INTEGRITY	V7IP8	Houston	10	45	0	0	0	0	0	0	0	0	0	0	55
SEA-LAND INTREPID	WDB9949	Charleston	44	0	0	0	0	0	0	0	0	0	0	0	44
SEA-LAND LIBERATOR	V7IQ2	Charleston	64	51	0	0	0	0	0	0	0	0	0	0	115
SEA-LAND MERCURY	MCDW9	Oakland	53	43	0	0	0	0	0	0	0	0	0	0	96
SEA-LAND METEOR	WDB9951	Miami	57	10	0	0	0	0	0	0	0	0	0	0	67
SEA-LAND MOTIVATOR	WAAH	Houston	55	46	0	0	0	0	0	0	0	0	0	0	101
SEA-LAND PERFORMANCE	KRPD	Houston	35	55	0	0	0	0	0	0	0	0	0	0	90
SEA-LAND PRIDE	WDB9444	Houston	102	67	0	0	0	0	0	0	0	0	0	0	169
SEA-LAND QUALITY	KRNJ	Houston	90	51	0	0	0	0	0	0	0	0	0	0	141
SEA-LAND RACER	MCDW2	Charleston	18	5	0	0	0	0	0	0	0	0	0	0	23
SELMA KALKAVAN	V7GX5	Norfolk	55	66	0	0	0	0	0	0	0	0	0	0	121
SIDNEY FOSS	WYL5445	Kodiak	19	2	0	0	0	0	0	0	0	0	0	0	21
SILKEBORG	EIJV	Houston	34	19	0	0	0	0	0	0	0	0	0	0	53
SINE MAERSK	OZOK2	Seattle	75	0	0	0	0	0	0	0	0	0	0	0	75
SKODSBORG	ZCIJ7	Baltimore	79	27	0	0	0	0	0	0	0	0	0	0	106
SOFIE MAERSK	OZUN2	Seattle	20	0	0	0	0	0	0	0	0	0	0	0	20
SOL DO BRASIL	ELQQ4	Baltimore	2	0	0	0	0	0	0	0	0	0	0	0	2
SOROE MAERSK	OYKJ2	Seattle	32	26	0	0	0	0	0	0	0	0	0	0	58
SOUND RELIANCE	WXAE	Kodiak	12	28	0	0	0	0	0	0	0	0	0	0	40
ST PAUL RESEARCH	KEY796	Anchorage	4	1	0	0	0	0	0	0	0	0	0	0	5
STAR ALABAMA	LAVU4	Baltimore	16	0	0	0	0	0	0	0	0	0	0	0	16
STAR AMERICA	LAVV4	Jacksonville	23	14	0	0	0	0	0	0	0	0	0	0	37
STAR EAGLE	LAWO2	Baltimore	26	24	0	0	0	0	0	0	0	0	0	0	50
STAR EVVIVA	LAHE2	Jacksonville	0	17	0	0	0	0	0	0	0	0	0	0	17
STAR FLORIDA	LAVW4	Houston	17	2	0	0	0	0	0	0	0	0	0	0	19
STAR GEIRANGER	LAKQ5	Seattle	47	44	0	0	0	0	0	0	0	0	0	0	91
STAR HANSA	LAXP4	Jacksonville	8	8	0	0	0	0	0	0	0	0	0	0	16
STAR HARMONIA	LAGB5	Baltimore	52	25	0	0	0	0	0	0	0	0	0	0	77
STAR HERDLA	LAVD4	Baltimore	23	0	0	0	0	0	0	0	0	0	0	0	23
STAR ISMENE	LANT5	Baltimore	28	47	0	0	0	0	0	0	0	0	0	0	75
STAR ISTIND	LAMP5	Houston	16	32	0	0	0	0	0	0	0	0	0	0	48
STAR JAPAN	LAZV5	Baltimore	9	38	0	0	0	0	0	0	0	0	0	0	47
STATENDAM	PHSG	Miami	68	61	0	0	0	0	0	0	0	0	0	0	129
STELLAR SEA	KGCJ	Kodiak	1	0	0	0	0	0	0	0	0	0	0	0	1
STEWART J. CORT	WDC6055	Chicago	6	0	0	0	0	0	0	0	0	0	0	0	6
STIMSON	KF002	Kodiak	100	51	0	0	0	0	0	0	0	0	0	0	151
STRONG PATRIOT	WCZ8589	Norfolk	82	1	0	0	0	0	0	0	0	0	0	0	83
SUMIDA	3FMX7	New York City	119	140	0	0	0	0	0	0	0	0	0	0	259

VOS Cooperative Ship Report

SUNBELT SPIRIT	V7DK4	New York City	15	12	0	0	0	0	0	0	0	0	0	0	27
SUSAN MAERSK	OYIK2	Seattle	21	27	0	0	0	0	0	0	0	0	0	0	48
SVEND MAERSK	OYJS2	Seattle	0	26	0	0	0	0	0	0	0	0	0	0	26
SWIFT ARROW	C6NI7	Anchorage	17	28	0	0	0	0	0	0	0	0	0	0	45
SYNERGY	NL9H	Kodiak	36	16	0	0	0	0	0	0	0	0	0	0	52
T/V ENTERPRISE	KVMU	New York City	17	29	0	0	0	0	0	0	0	0	0	0	46
TAIO FRONTIER	3EZF5	Anchorage	10	2	0	0	0	0	0	0	0	0	0	0	12
TAMPA	LMWO3	Baltimore	23	20	0	0	0	0	0	0	0	0	0	0	43
TAN'ERLIQ	WCY8497	Valdez	3	7	0	0	0	0	0	0	0	0	0	0	10
THOMAS G. THOMPSON	KTDQ	Seattle	8	54	0	0	0	0	0	0	0	0	0	0	62
TITAN	WAW9232	Kodiak	2	10	0	0	0	0	0	0	0	0	0	0	12
TREIN MAERSK	MSQQ8	Baltimore	16	20	0	0	0	0	0	0	0	0	0	0	36
UBC SAIKI	P3GY9	Seattle	49	38	0	0	0	0	0	0	0	0	0	0	87
UBC SVEA	P3JA8	Seattle	27	25	0	0	0	0	0	0	0	0	0	0	52
UNITED SPIRIT	ELYB2	Seattle	80	68	0	0	0	0	0	0	0	0	0	0	148
UNIVERSAL SPIRIT	ELNT7	New York City	36	5	0	0	0	0	0	0	0	0	0	0	41
USCGC ALEX HALEY	NZPO	Kodiak	7	10	0	0	0	0	0	0	0	0	0	0	17
USCGC MAPLE (WLB 207)	NWBE	Kodiak	9	3	0	0	0	0	0	0	0	0	0	0	12
USCGC POLAR STAR	NBTM	Seattle	75	176	0	0	0	0	0	0	0	0	0	0	251
VALDEZ RESEARCH	WXJ63	Valdez	221	204	0	0	0	0	0	0	0	0	0	0	425
VALENCIA BRIDGE	HOUU	Anchorage	50	31	0	0	0	0	0	0	0	0	0	0	81
VANCOUVER BRIDGE	H8FE	Seattle	10	6	0	0	0	0	0	0	0	0	0	0	16
VEENDAM	PHEO	Miami	0	41	0	0	0	0	0	0	0	0	0	0	41
VIKING STAR	WAS4138	Kodiak	6	1	0	0	0	0	0	0	0	0	0	0	7
VINCENT THOMAS BRIDGE	H3WJ	Seattle	53	22	0	0	0	0	0	0	0	0	0	0	75
VIRGINIA BRIDGE	HOKP	Anchorage	50	47	0	0	0	0	0	0	0	0	0	0	97
VIRGINIAN	KSPH	Oakland	0	2	0	0	0	0	0	0	0	0	0	0	2
VLADIVOSTOK	P3BJ8	Seattle	2	0	0	0	0	0	0	0	0	0	0	0	2
WESTERDAM	PINX	Miami	18	44	0	0	0	0	0	0	0	0	0	0	62
WESTWARD VENTURE	KHJB	Seattle	1	0	0	0	0	0	0	0	0	0	0	0	1
WESTWOOD ANETTE	C6QO9	Seattle	15	14	0	0	0	0	0	0	0	0	0	0	29
WESTWOOD COLUMBIA	C6SI4	Seattle	47	44	0	0	0	0	0	0	0	0	0	0	91
WESTWOOD MARIANNE	C6QD3	Seattle	57	11	0	0	0	0	0	0	0	0	0	0	68
WESTWOOD OLYMPIA	C6UB2	Seattle	42	37	0	0	0	0	0	0	0	0	0	0	79
WESTWOOD RAINIER	C6SI3	Seattle	26	21	0	0	0	0	0	0	0	0	0	0	47
WESTWOOD VICTORIA	C6SI6	Seattle	31	30	0	0	0	0	0	0	0	0	0	0	61
WILSON	WNPD	New Orleans	22	12	0	0	0	0	0	0	0	0	0	0	34
WOLDSTAD	KF001	Kodiak	10	4	0	0	0	0	0	0	0	0	0	0	14
WOLVERINE	WZC4518	Chicago	22	0	0	0	0	0	0	0	0	0	0	0	22
WORLD SPIRIT	ELWG7	Seattle	3	85	0	0	0	0	0	0	0	0	0	0	88
YM GENOVA II	ELVX2	New York City	62	50	0	0	0	0	0	0	0	0	0	0	112
ZAANDAM	PDAN	Miami	21	43	0	0	0	0	0	0	0	0	0	0	64
ZENITH	C6FU3	Miami	9	4	0	0	0	0	0	0	0	0	0	0	13
ZIM AMERICA	9HAB8	New York City	46	35	0	0	0	0	0	0	0	0	0	0	81
ZIM BEIJING	A8FU7	New York City	8	5	0	0	0	0	0	0	0	0	0	0	13
ZIM HONG KONG	9HGP7	Houston	50	0	0	0	0	0	0	0	0	0	0	0	50
ZIM ITALIA	4XGT	New Orleans	32	41	0	0	0	0	0	0	0	0	0	0	73
ZIM SAVANNAH	A8ER9	New York City	14	3	0	0	0	0	0	0	0	0	0	0	17
ZIM SHANGHAI	SVBC	New York City	0	8	0	0	0	0	0	0	0	0	0	0	8
ZUIDERDAM	PBIG	Anchorage	17	11	0	0	0	0	0	0	0	0	0	0	28

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
TOTAL SHIPS: 476	16,557	15,141	0	0	0	0	0	0	0	0	0	0	31,698

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